



**DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
SEATTLE IMPLEMENTATION CENTER  
SEATTLE, WASHINGTON**



**BOISE MCGOWAN FIELD AIRPORT  
BOISE, IDAHO  
AIRPORT TRAFFIC CONTROL TOWER (ATCT)  
AND BASE BUILDING SITE ADAPTATION  
DESIGN PROJECT**

**PROJECT PLANNING DOCUMENT (PPD)**

**January 26, 2007**





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FOR  
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AND BASE BUILDING SITE ADAPTATION  
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**BOISE McGOWAN FIELD AIRPORT  
BOISE, IDAHO**

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January 26, 2007



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1. INTRODUCTION

1.1. Summary of Work

- This Project Planning Document (PPD) sets the requirements for the project titled Airport Traffic Control Tower (ATCT) and Base Building Site Adaptation Design Project at Boise McGowan Field Airport.
- The New ATCT Facility shall be designed as a combined facility with Administrative Base Building and a non-occupied TRACON area.
- The design shall be modeled after the new Standard Design (525 sq.ft.) Intermediate ATCT standards. The Base Building shall be approximately 11,000 sq.ft.

1.2. ATCT Siting

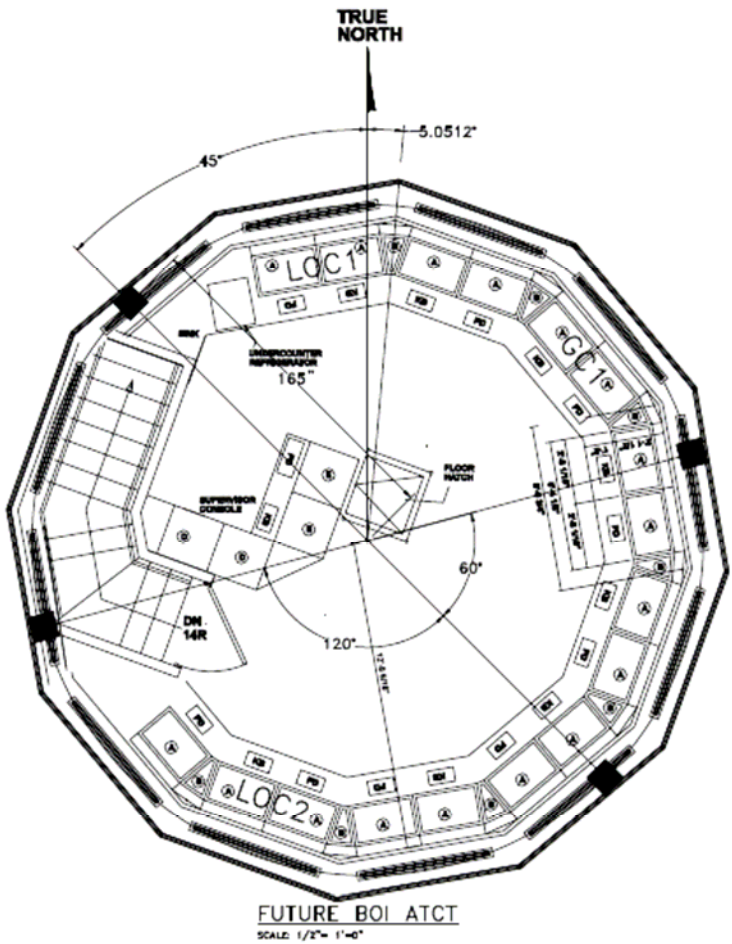
- A tower siting study, utilizing the facilities at the FAA’s Airport Facilities Tower Integration Laboratory (AFTIL) has been completed. The report recommends the new ATCT/Base Building be located at site 4B on the south side of the airfield, north of the new runway.
- The property is owned by the City of Boise.
- The ATCT shall be located at latitude 43° 33’ 21.07”N and longitude 116° 13’ 09.34”W NAD 83. The center of the ATCT building shall be located within 10 feet this location.
- The ground elevation is estimated to be 2846 MSL.

1.3. Tower Height

- The cab finish floor elevation is 255 feet above ground level (AGL). Overall facility height shall not exceed 290 feet AGL. The top of the structure elevation is limited to 3136 AMSL.
- Avoid roof mounted equipment, antennas, and air terminals, if possible

1.4. Control Cab Simulation

- A control cab simulation has been completed and it was determined that a four column cab support design shall be used with the cab rotation as per the angel specified.



1.5. ATCT Classification

Facility Type:	Stand Alone ATCT
Current Level:	8
Hours of Operation:	24
Current Positions:	4
Automation:	ARTS IIE

1.6. Terminal Operational Position

BOI ATCT Positions	Existing ATCT	New ATCT Validated
<b>Operational Positions:</b>		
Local 1	1	1
Local 2	0	1
Ground Control 1	1	1
Ground Control 2	0	0
<b>Support Positions:</b>		
Cab Coordinator	0	1
Flight Data	0	0
Clearance Delivery	1	1
Cab Supervisor/CIC	1	1
Traffic Management	0	0
Total Positions	4	6

1.7. ATO-T Staffing Requirements

TERMINAL PERSONNEL		
FUNCTION	ATCT/TRACON Staffing	Final Validated New ATCT Staffing
	Current Staff Level-8 Hrs of Ops = 24	
Terminal Manager	1	1
Assistant Terminal Manager	0	0
Operations Manager	0	0
Operations Supervisor	3	2
Support Manager	0	0
Staff Specialist & Support	2	1
Terminal Control Specialist	27	13
Other Terminal Personnel	0	0
Administrative Officer	1	0
Secretary	0	0
Clerical	0	0
Traffic Management Officer	0	0
Traffic Management Coordinator	0	0
Security Guards	0	0
Contract Weather Observers	0	0
US Customs Staff	0	0
Contractors	0	0
Terminal Personnel Total	34	17



1.8. ATO-W Staffing Requirements

FUNCTION	ATCT/TRACON Staffing	Final Validated
	Current Staff Level-8 Hrs of Ops = 24	New ATCT Staffing
Tech Ops Facility Manager	0	0
Tech Ops SSC Manager	0	0
SPS- Systems Performance Specialist	0	0
Administrative Coordinator	0	0
Coordinator	0	1
On Site ATSS	0	0
Technical Duty Stations Techs	0	8
Tech Ops Total	0	9

1.9. Facility Requirements

1.9.1. Space Allocation

ATCT SPACE ALLOCATION			
ROOM FUNCTION	Prop. Space	No. of Rooms	Total Space
CONTROL CAB (~250' to cab floor)			
ASDE Penthouse			0
Cab			525
CABLE ACCESS LEVEL/CABLE ACCESS RING			
Approximate Gross Floor Area			1,260
Other Areas (stairs, elevator, etc...)			515
Spare Equipment Room			105
Console Access Ring			640
JUNCTION LEVEL			
Approximate Gross Floor Area			1,810
Other Areas (stairs, elevator, etc...)			555
Breakroom & Corridor			395
Elevator Closet			20
Electronic Equipment			245
Restrooms (Men's and Women's)			85
Mechanical Room			490
Janitor Closet			20
PLUMBING ACCESS LEVEL			
Approximate Gross Floor Area			1,320
Other Areas (stairs, elevator, etc...)			575
Plumbing AccessRing			745
TYPICAL SHAFT LEVEL			
Approximate Gross Floor Area			580

1.9.2. Special Consideration

1.9.2.1. Design

- The ATCT and Base Building will be constructed with a non-occupied TRACON area.
- Validated staffing is for 21 people, however the facility will be sized to accommodate 30, which is consistent with the approximate total number of personnel required should the non-occupied TRACON area become operational in the future.
- Mechanical heating and cooling systems will be sized per the actual occupancy of the building. The empty TRACON operations room will be heated and cooled as unoccupied storage space.
- Electrical systems, including engine generator capacity, will be sized per the actual occupancy of the building.
- The TRACON operations area will be constructed with a depressed slab to accommodate future raised floor. The signal reference grid (SRG) will not be installed at the time of construction.
- All other architectural features normally associated with a TRACON operations room, such as ceiling, carpeting, consoles, etc, will not be furnished for this facility.

1.9.2.2. Means of Egress

- The ATCT will be constructed with the Standard Design Intermediate Activity Tower with one stair removed and the elevator will be used as the second means of egress.

1.9.2.3. Power System

- The new ATCT and Base Building will be provided with an Engine Generator (E/G) and UPS. Approximate size of the E/G is 300 kW.

1.10. Drawings and Specifications

1.10.1. Drawings

- The drawings shall be prepared using AutoCAD converting to Computer Aided Engineering Graphics (CAEG) in Bentley MicroStation format in D-Size Sheets (22" X 34"). Half Size (11" X 17") drawings shall be used for most reviews. The design shall be customized for Boise and shall utilize design elements from the Terminal Facilities Design Standard – Intermediate Activity Level Airport Traffic Control Tower (525 S.F. Cab with Dual Egress). Many drawings such as floor plans (architectural, structural, and fire safety), equipment layouts, cable plans, etc. are site specific and will be unique to Boise, Idaho. Electronic files shall be provided to FAA in accordance with the FAA CAEG standards at the 100% submittal. Specific electronic files shall also be submitted to FAA upon their request.

1.10.2. Specifications

- The specifications shall be in electronic format (Microsoft Word) using the Terminal Facilities Standard Designs Specification. Some sections of Division One shall be as required by the FAA.

End of Section



2. PHYSICAL SECURITY

2.1. Asset Value

- The threat level at the Boise Airport is relatively low. The Standard Security requirements for a Security Level 2 Facility will be used.
- The facility design will include a standard security perimeter fence with 1'-0" outrigger with barbed wire and a 20 foot clear zone on the exterior of the fence. The base building is set back 300 feet from the security fence on all sides except to the east, where the fence is shared with the Idaho Air National Guard Base. The tower siting is such that it is less than 300 feet to the fence adjoining the public side at the south east of the site, and blast mitigation measures will need to be considered. Parking and driveways within the site will be set back from critical areas and the tower at least 100 feet. Security requirements will be compliant with FAA Order 1600.6C and ANM-700 recommendations. The fence details will follow the requirements set forth in FAA Order 1600.6C. *Variance will be required from FAA Facility Security Specialist.*
- The facility shall be designed to meet all current FAA Security Orders subject to the final configuration of the fence line and entrance driveway to the National Guard Facility.

2.2. Perimeter security

- One half of the site perimeter is adjacent to the National Guard Facility Secured Area. A new fencing will be provided at the site boundary line which will be finalized with the City of Boise.
- Chain link fencing shall be located on all sides of the site.
- The vehicle gates shall be crash resistant.
- Sufficient lighting and cameras shall be installed along the perimeter for complete closed circuit TV (CCTV) coverage of the site boundary.

2.3. Access Roadway

- The present access roadway to the site will be modified and leaving only S. Ulm Street to be the primary access road to the ATCT and adjacent National Guard Facility.

2.4. Blast Design

- Blast mitigation design is based on a predefined event at a specified distance from the point where the load is applied. The actual event varies for different conditions and is considered Security Sensitive Information and cannot be included in this report but shall be provided to the structural engineer of record.
- The ATCT and Base Building shall be designed for a blast of a pre-defined amount of TNT placed along the landside perimeter as required by applicable FAA Security Orders if required.

2.5. Additional Requirements

- All high use doors, entrance gates, and loading dock shall be monitored by CCTV with recording capability.
- All controlled access areas shall have proximity card readers. Any door leading to a high security area shall have a keypad along with the proximity card reader.
- All power for security lighting and operation of the exterior gates shall be on the engine generator.
- The Security System power shall be on the engine generator.
- Automated entrance and exit gates shall control access to the site. This shall consist of single gate for both entering and exiting purpose. FAA personnel will use proximity badges to activate the gate. Visitors and deliveries will use the intercom to contact FAA personnel inside the complex who will activate the gate if admittance is granted. The exit operation will be using pavement induction loops to activate the gate for a "free exit".
- Government owned and employee owned vehicles will be parked inside the site. All parking shall be at least 100 feet from the buildings.
- All deliveries will be to an open-air designated loading area.

End of Section



3. CIVIL DESIGN BASIS

3.1. Site Description

- The site has been selected and the exact location and height of the New ATCT defined by the FAA.
- Access for all traffic is to be from the south by S. Ulm Street.
- Previously used as light industrial with low buildings and yard storage.
- Scrub vegetation, no organized landscaping worth saving.
- The site may need the addition of fill to provide positive drainage away from the buildings.

3.2. Soils

- A geotechnical report is being prepared which will be used to determine excavation conditions, bearing capacity and acceptability of soils for stormwater disposal.

3.3. Traffic

- Anticipated traffic to this site is for the most part passenger vehicles and light trucks.
- A loading bay will be provided for delivery trucks and the occasional tractor-trailer (WB50) unit. The heaviest vehicles visiting the site will be fuel delivery trucks.
- The General Contractor will be expected to provide for his own requirements regarding deliveries and lifting equipment, and traffic generally.
- Parking will be provided for 30 stalls with special consideration for appropriate handicapped and motorcycle stalls.

3.4. Present Use and Condition

- The site has been used as a light industrial steel fabrication shop and yard. All buildings, slabs and other improvements will be demolished and removed by the City of Boise prior assigning the ATCT and Base Building Construction Contract.

- One active power pole will be left for the Contractor’s use during construction.

3.5. Utility Materials

- No unusual conditions exist requiring special consideration for materials or design.
- Water services on the site will meet AWWA requirements and local building permit standards.
- The sanitary sewer connection will meet the City of Boise Site Servicing requirements.

3.6. Existing Services

- Demands made by the project on existing facilities serving the property are relatively small.
- A watermain along the east side of the site is eight inches in diameter. Pressure and flow information is forthcoming from the utility for the mechanical engineer.
- The sanitary sewer is an eighteen inch line passing along the northern boundary within the National Guard Facility Secured area.

3.7. Treatment of Effluents

- Only domestic sewage will be discharged to the public sanitary sewer. On site treatment is not be required.

3.8. Fencing

- Two sides of the property will be enclosed using seven foot high chain link fencing surmounted with three strands of barbed wire in accordance with FAA security requirements. A 20 ft clear area outside the fence will be provided on sections not within the airport security fence.
- The site is fenced along the north and east boundary. It is anticipated that, in the interests of economy, this section of fence can be brought up to FAA standards and retained.
- An automatic gate for vehicular access and regulated man gates for pedestrians will be installed. Electronic security is being provided under the electrical requirements.

3.9. Stormwater Management

- There is no storm drainage system to the site. Boise has minimal annual precipitation of about 12 inches, which is spread uniformly throughout the year. The usual method of managing storm water is to allow it to be absorbed locally or to run off the site. If soil conditions are favourable, rock pits and drainage trenches may provide an effective and economical way of disposing of water from the ATCT roof and the parking lot.

3.10. Off Site Ductbanks

- The Draft Scope of Work Calls for a network of duct banks for a Fibre Optics Transmission System (FOTS) connecting the following FAA facilities. Existing ducts are to be used where possible.

New ATCT	43° 33’ 21.07”N	116° 13’ 09.34”W
ASR-11	43° 32’ 58.40”N	116° 12’ 46.85”W
RTR-T	43° 33’ 49.65”N	116° 12’ 32.50”W
10R Glide Slope	43° 34’ 04.50”N	116° 14” 22.7”W
10R Localizer	43° 33’ 37.02”N	116° 12’ 12.03”W
Old ASR-7	43° 33’ 55.50”N	116° 14’ 09.70”W
(will be used as RTR and FOTS Node Site)		
Centerfield Wind	(may be connected at Old ASR-7 site)	

- It is understood that much of the network exists and that only two connections are now to be considered for this Contract. Specifically, connecting the New ATCT to the existing ASR-11 facility and providing for a connection between the New ATCT and the Old ASR-7 facility. One route for the ASR-11 connection is shown on the drawings. Some alternative routes for the connection to Old ASR-7 are shown.

3.11. Contractor Facilities

- The site is large enough for the contractor to undertake normal construction operations without having to use adjacent areas. The Contractor will be expected to make his own arrangements for an off site staging area and for storage of materials and equipment.

End of Section



## 4. ARCHITECTURAL DESIGN BASIS

### 4.1. General

- The purpose of this project is to construct a new Intermediate Activity Air Traffic Control Tower (ATCT) and Base Building at the Boise Airport, (BOI) Idaho, to replace the current Federal Aviation Administration (FAA) Airport Traffic Control Tower. The primary architectural considerations will be based after the new standard design 525 sf intermediate ATCT standards and modified as appropriate for use at Boise. The new facility will be sized to accommodate a future TRACON facility In the event such a function is required in the future.
- The recommended location for the tower and base building site is site 4B as identified in the tower siting study. It is located at the south side of the airfield, north of the new runway. It is bounded to the east by the Idaho Air National Guard (IANG) Base and to the north by W. Harvard St. Access to the site will be from the southeast corner of the site, adjacent to the IANG public access.

### 4.2. Architectural Compatibility

- The design considerations for this facility consists of providing an efficient, low maintenance facility which meets the operational requirements of the airport, harmonizes with the surrounding environment, and is consistent in character with the existing and proposed airport facilities. Because a 255+ ft ATCT will be by far the dominating visual element in the area, special attention will be given to its aesthetic appearance to provide a dynamic contemporary image that clearly expresses its functional role, and yet establishes a progressive architectural direction.
- For the base building, split face masonry in light earth tones (ASR-11 building) as well as brick (IANG building) are common wall cladding materials used in the immediate area. Blue pre-finished sloped metal roofs are also a dominant architectural material used in the vicinity. However, this roof type is not compatible with the proposed design of the base building which is a "flat" (i.e.: low slope) roof. It is proposed to use split face and smooth concrete block in subdued earth tones with pre-finished ribbed metal panels and fittings in a metal platinum color to provide a visual counterpoint and overall aesthetic balance.

- For the tower, exposed cast-in-place concrete, possibly painted to visually tie in with the base building more closely, is proposed for the shaft. At the subjunction and junction levels, the proposed exterior finish is proposed to be glass fiber reinforced concrete (GFRC) panels, selected for their strength, durability, and non-reflective radar properties. The exterior material of the console access and control cab levels will be insulated composite metal panels.
- The landscape will follow "xeriscape" concepts to minimize maintenance. The term 'xeriscape' is copyrighted by the Denver Water Department and refers to landscaping designed with low water consumption in mind. Trees and bushes will be designed in a manner that will minimize hiding opportunity for individuals and bomb threats to the facility. In accordance to Federal mandates, the landscaping will include native species that do not promote bird population. Parking facilities within the perimeter security fence will be designated for employee and government vehicles only

### 4.3. Type of Construction

- The design considerations for this facility consists of providing an efficient, low maintenance facility which meets the operational requirements of the airport, harmonizes with the surrounding environment, and is consistent in character with the existing and proposed airport facilities.
- Proposed structural materials for the ATCT and base building will be non-combustible steel and concrete, selected for their qualities of durability/long service life, low maintenance, and efficiency/economy. Although not specifically mandated, consideration will also be given to using materials that are environmentally responsible.

### 4.4. Building Insulation

- Proposed insulation R-values are as follows: R-19 for walls and R-30 for roof areas. Foundation insulation will be min. R-10. The non-functional shaft will not be insulated, but all occupied spaces and service/elevator shafts will be insulated. Roof insulation is proposed to be closed cell polystyrene.
- R-values are based on insulation levels as set out in FAA Order 6480.7D, paragraph 112. The Architect will confirm that these insulation levels are appropriate for the climate in Boise and will adjust them accordingly if and as required.

### 4.5. Construction Materials and Finishes

- The base building will employ an open-web steel joist roof framing system supported at the long sides of the exterior walls and along one side of the central longitudinal corridor by reinforced concrete masonry units (CMU). The roof is proposed to be low slope 2-ply SBS membrane, with R-30 rigid roof insulation on steel deck. Interior walls will be painted gypsum board on steel stud unless concrete block is required for supporting walls. Floors will be concrete slab-on-grade.
- The exterior structure of the ATCT and Base Building will be clad with materials that will not cause adverse radar or instrument landing system (ILS) signal reflections. Exterior finish system is to be fully coordinated with FAA radar and electronics engineers. Access and maintenance of the exterior cladding system will be ensured and cladding components and assembly options will address diverse climatic conditions



**4.6. Equipment List**

- At this stage in the design process, equipment such as portable equipment, work benches, shelving, bins, and removal partitions have not been identified. The compilation of this equipment list will require close coordination with FAA staff.

**4.7. System Finish Options**

- The size of this facility does not warrant a detailed life cycle cost analysis of three different system/finish options. However, selected systems and finishes will be justified at the 35% submission stage in regards to reasons for selection.

**4.8. Space Programming**

- Refer to base building floor plan and junction level floor plan for table of rooms with programmed and areas as designed.
- At this stage in the design process, collateral equipment and furnishings have not been identified. The compilation of this list will require close coordination with FAA staff.

**4.9. Water and Moisture Proofing**

- The proposed roofing membrane is 2-ply SBS modified bituminous membrane roofing. A single ply EPDM membrane may also be used. The roof membrane will be fully adhered to the underlying insulation. The roofing materials will be selected to provide high reflectivity and high emissivity over the life of the product in order to maximize energy savings and minimize heat island effects. This will be achieved by incorporating a light mineral coating over the SBS membrane. Inverted roof membranes are not anticipated.
- The exterior wall system of the base building will be designed in conformance to best rain screen design principles, involving a well ventilated air space behind the exterior cladding system.
- Typical roof assembly for the base building will be 2-ply SBS or single ply EPDM membrane on R-30 rigid insulation on metal deck on open web steel joists. Typical exterior wall assembly will be 10” reinforced concrete masonry units with waterproof fully adhered membrane on the exterior face, spray-on foam plastic insulation, air space, and exterior cladding (split face concrete block or pre-finished metal panels).

**4.10. Cab Glazing and Exterior Wall Construction:**

- The glazing for the tower cab tower will meet FAA standards of light transmittance, thermal transmittance and low distortion. Due to the size and installed angle of the glass, the thickness of each individual pane is to be 1/2". Glass quality shall be q3 or better (ASTM C1036). Minimum light transmittance is to be 87% minimum per lite (low iron content), and visible reflectance is not to exceed 8%. Because of the thickness of glass required for structural reasons, low-E coating is not possible. Due to the requirement for low distortion, heat strengthening or laminating is also not an option. Vertical joints in the glass panels will be sealed with clear structural silicone of a type acceptable to the FAA.
- The exterior cab wall will be insulated composite metal panels above the glass. The exterior of the console access ring can be insulated composite metal panels, glass-fiber reinforced panels, or pre-cast concrete panels. Further research will be required to determine the most suitable material.
- The cab roof will be either a 2-ply SBS fully adhered membrane or a single ply EPDM, both of which are two roof membrane types with a long track record of high reliability and low maintenance.
- A mock-up of the cab exterior wall will be specified in the construction documents in order to fully assess the materials and assembly.

**4.11. Local Building Authorities and Permit Procedures**

- The zoning of the site is M-1 (Light Industrial). This zoning allows for the aviation facilities directly, so a rezoning process is not required. In addition, the site does not fall within a Design Review (D.R.) area, so we will not (likely) be forced to go through this process either, and instead, will only be subject to approval of a simple Building Permit, however the proposed ATCT height does exceed the M-1 zoning allowance, and hence, a "Conditional Use Permit" (CUP) will be required to permit the variance. This is a public process involving a scheduled Public Hearing. Prior to making the application, the applicant must carry out a "pre-application conference" with the Planning Dept. and a separate Public Meeting with all owners of properties within 300 ft. of the site.
- The FAA is not bound to follow the City of Boise’s rules or process. However, it is recommended that any comments and concerns identified by local authorities be addressed as much as possible.

End of Section



5. STRUCTURAL DESIGN BASIS

5.1. General

- The new ATCT, Base Building, and the link shall be designed per the following design guides and codes:
  - International Building Code, 2003
  - ASCE 7-02 Minimum Design Loads for Buildings and Other Structures
  - ATCT Facility Design Guide, FAA 6480.7D
- The design shall be performed using software such as ETABS developed by Computers and Structures Computer analysis for the ATCT model shall be a three dimensional model.

5.2. Material Codes

- Cast-in-place concrete shall be designed in accordance with the American Concrete Institute (ACI) 318-02 *Building Code Requirements for Structural Concrete*.
- Precast concrete, if required, shall be designed in accordance with the Portland Cement Institute (PCI) *Design Handbook, 5<sup>th</sup> Edition*.
- Structural steel shall be designed in accordance with the American Institute of Steel Construction (AISC) manual of *Steel Construction, 9<sup>th</sup> Edition*.
- Steel bar joist shall conform to the Steel Joist Institute (SJI) *Standard Specification and Load Table*. Roof deck, composite and non-composite floor deck shall conform to the Steel Deck Institute (SDI) *Design Manual for Composite Decks, Form Decks, Roof Decks, and Cellular Metal Floor Deck with Electrical Distribution*.

5.3. Standard Loading

5.3.1. Live Gravity Loads

5.3.1.1. Airport Traffic Control Tower

ASDE:		
Penthouse Roof		N/A
Penthouse Floor		N/A
Cab:		
Floor	Roof	30 psf exclusive of ASDE penthouse 150 psf or 500 lbs concentrated
Console Access Level		
Exterior Walkway		150 psf
Duct Plenum		100 psf
		50 psf
Mechanical Room		
Electronic Equipment Level		100 psf
AT Level		100 psf
Antennae Balconies		150 psf
Shaft		
Stairs & Landings		100 psf
Elevator Lobby		100 psf
Mechanical Chase		250 psf
Electrical Chase		150 psf

5.3.1.2. Base Building

Roof	30 psf (minimum)
Office Areas, Lobbies, Stairs, Corridor	100 psf
Stair Concentrated Load On Stringer	300 lbs
Light Storage	125 psf
Mechanical/Electrical/Equip. Rooms	250 psf
Drawing File Room	250 psf

5.3.2. Dead Loads

- Actual self weight of building materials used with a partition allowance.

5.3.3. Wind Loads

- Wind loading shall comply with ASCE 7-02, with a 3-second gust speed of 90 mph and an exposure “C”. The Occupancy Category IV is Essential Facility with an Importance Factor for wind of 1.15. Considering the possible sensitivity of the tower to dynamic wind responses, wind tunnel testing could be conducted to study the tower’s dynamic response characteristics under wind load. The tower shall be modeled adequately to determine the fundamental periods of vibration in response to wind loads for design purposes.
- The tower shaft shall be designed to limit the lateral drift (story lateral deflection / story height) to 0.002.

5.3.4. Seismic Loads

- Seismic loads for Boise shall be based on short period Ss of 0.35g and SI of 0.17g. Soil profile type is expected to be Class D, very dense soil and soft rock. The design spectral response accelerations S<sub>DS</sub> and S<sub>DI</sub> have been determined to be 0.36g and 0.19g respectively
- The Occupancy Category IV is Essential Facility with an Importance factor for seismic of 1.50.



5.3.5. **Special Loading:**

- a. Antennae. The structure shall accommodate the support of communication antennae, ASDE, microwave antennae, and other special equipment where required.
- b. Cab Glass. The catwalk and roof levels shall be designed to accommodate the weight of the cab glass, window washing equipment, and other loads associated with the maintenance or replacement of the cab glass.
- c. Elevators. Manufacturer’s load data with a 100% impact factor shall be used in the design of the elevator support.
- d. ASDE. ASDE penthouse will not be requirement for this tower.
- e. Blast. The ATCT is 224’ inside the secured boundary. Although Blast effects from that distance is minimal, A Blast analysis will be conducted to determine the impact of Blast loads. Blast loads shall be per “Security Reference Manual Part 3”, which is a supplement to the blast protection requirements of FAA Order 1600.69C. The Blast analysis will be conducted for the tower shaft only up to the junction level. ***FAA Facility Security specialist to confirm the acceptance of this approach.***
- f. Missing Column Analysis. The Base Building will be a single storey building with roof structure designed to have redundant system to resist seismic requirement. Therefore a separate analysis for progressive collapse will not be necessary. ***FAA Facility Security specialist to confirm the acceptance of this approach..***

5.3.6. **Snow Loads**

- Snow loads for Boise shall be based on ground snow load of 20 psf, and an Importance factor of 1.2.

5.3.7. **Load Combinations**

- Building component shall be designed to resist the combined effects of dead loads, live loads, and lateral loads. The most stringent load combinations from the design codes listed above would apply.

5.4. **Strength of Materials**

- The following is a representative list of structural materials. Final design considerations may dictate higher strength materials.

Structural Steel:	ASTM A992 (Fy=50 ksi), ASTM A572 (Fy=50 ksi)
Structural Tubing:	ASTM A500 (Fy=46 ksi)
Structural & Anchor Bolts:	ASTM A325
Cast-in-place Concrete:	min 4000 psi, air entrained
Precast Concrete:	5000 psi, air entrained
Reinforcing Steel:	ASTM A615, Grade 60
Welded Wire Fabric:	ASTM A185
Hollow load bearing Masonry:	ASTM C90
Welding Electrodes:	E70 Series

5.5. **Material Selection**

5.5.1. **ATCT**

- The structural system for the ATCT shall satisfy the architectural requirements both functionally and aesthetically. The design criteria is based on optimizing construction cost vs. long term durability, availability of skilled labor and materials, speed of erection, maintenance and Air Traffic operational requirements. The project would explore the use of cast-in-place concrete shaft with a structural steel frame for the upper floors and cab areas.

- The maximum nominal column dimensions are 12" x 12".
- Glazing mullions support the glazing panels for wind and seismic. Derivation of final wind and seismic design and glass loading shall determine the actual mullion sizes.
- The tower foundation shall be a cast-in-place concrete pad footing embedded below the ground surface.

5.5.2. **Base Building**

- The structural system for the Base Building shall satisfy the architectural requirements both functionally and aesthetically. The design shall take into consideration of optimizing construction cost vs. long-term maintenance costs. The distances from the Base Building to the nearest ”secured boundary” are such that no blast load analysis is required.
- The ground floor shall consist of a concrete slab on grade. The roof system shall be metal deck supported on beams and girders of the rigid frames.
- The exterior of the building shall have limited openings as required for ingress and egress, as well as fire fighting. The building perimeter wall is anticipated to be concrete masonry.
- The Base Building shall be supported on shallow foundations

5.6. **Structural Submittals**

- Structural design calculations shall be indexed and submitted to FAA for review. All design loads shall be identified and design methods and assumptions shall be indicated. Computer output shall include input diagrams and information needed to relate the printout to the design elements.
- Structural drawings shall include a list of design loads and the strengths of materials used, including foundation capacity.

End of Section



6. MECHANICAL DESIGN BASIS

6.1. General

- The mechanical engineering for the new ATCT and Base Building shall be designed per the following design guides and codes:
  - International Building Code, 2003
  - ATCT Facility Design Guide, FAA Order 6480.7D
  - 10 CFR 435 and 436 – Code of Federal Regulation
  - Mechanical Engineering Design and Life Cycle Cost (O & M) Guideline For ATCT and TRACON Facilities”, (draft) revised December 8, 2006.

6.2. Basis of Design – HVAC Systems

- Three Central Station HVAC Options will be considered and evaluated under a Life Cycle Cost (LLC) Analysis with a summary will be presented at the 35% submission, listed as:

6.2.1. System 1:

- Packaged air-cooled chilled water plant with variable speed pumping, central station variable volume air handling unit, air volume terminal units with hot water reheat coils and natural gas heating water boilers. The Tower systems will be served by a four-pipe fan coil system. The Base-Building TRACON and Equipment Rooms will be served by up to three (3) chilled water computer room air conditioning (CRAC) units with N + 1 redundancy.

6.2.2. System 2:

- Same as System 1 above except replace the packaged air-cooled chiller plant with a water-to-water heat pump system in the central station air handler and an outdoor industrial fluid cooler (closed system) with spray coil capacity. The Tower systems will be distributed water-cooled heat pumps. The Base-Building TRACON and Equipment Rooms will be served by up to three (3) water cooled CRAC units with N + 1 redundancy.

6.2.3. System 3:

- Same as System 2 above except replace the hot water boiler system reheat coils and air handling preheat coils with electric coils.

6.3. HVAC – Design Conditions

6.3.1. Tower Design Occupancy

- Hours Occupied: 24 hours/day – 7 days per week
- 6 persons on duty in the cab.
- Break Room sized for up to 6 persons.

6.3.2. Base Building Design Occupancy

- Hours Occupied: 24 hours/day – 7 days per week.

6.3.3. Cooling and Heating Design Conditions

6.3.3.1. Summer Outside Design Temperatures

For building loads:

- 96 degrees FDB (0.4%) annual ASHRAE 2001)
- 63 degrees FWB (1% annual mean coincident wb ASHRAE 2001)

6.3.3.2. Winter Outside Design Temperatures

For building loads:

- 2 degrees FDB (99.6% annual ASHRAE 2001)

6.3.3.3. Wind (Heating/Design Conditions)

- Winter – 6 miles per hour Mean Wind Speed, primary wind direction 130 degrees (99.6% annual ASHRAE 2001)
- Coldest Month – Wind Speed 22 miles per hour, 37 degrees FDB [Mean coincident] (0.4% annual ASHRAE 2001)
- Extreme Wind Speed – 24 miles per hour (1% annual ASHRAE 2001)

6.3.3.4. Site Location

- Latitude (N) 43.57 degrees
- Longitude (W) 116.22 degrees
- Elevation above sea level, 2867 feet

6.3.3.5. Inside Design Temperatures – HVAC

- Summer – 72 ± 3 degrees FDB
- Winter – 68 degrees FDB, 30% to 70% RH (Critical Spaces 73° FDB ± 2 degrees 35 to 60% RH ± 5%)

6.3.3.6. Ventilation

- The building design ventilation rates:
- Toilet rooms, janitor closet 8 air changes/hour minimum (2 CFM per sq.ft.)
- Occupied Areas: 20 CFM/person



6.3.4. HVAC System Design – Calculations

- Cooling load and heating load calculations have been run using Carrier E20-II, HAP V4, 30 (2005) software for six (6) zones of the facility as follows:

Zone #	Area	Loads	
		Cooling Tons	Heating MBH
1	Base Building & Link	18.0	159.0
2	Future TRACON & Equipment Rooms	30.0	8.8
3	Tower – First Floor to Plumbing Access Level	4.8	101.3
4	Tower – Junction Level	7.5	14.7
5	Tower – Console Access Level	6.4	10.8
6	Tower – Controls	9.1	57.4
	TOTALS	75.8	352.0
	Zone #2 add (See NOTE 2 below)	N/A	30.0
	TOTAL	75.8	382.0

Notes:

- The Zone #1 Base-Building and Link calculation is based on a single V.A.V. zone for preliminary estimate only. Final V.A.V. zone calculations will be submitted at the 35% stage.
- The Zone #2 Future TRACON and Equipment Room heating load calculation is the net heating load (i.e. heating credit included for electrical equipment load). Add 30MBH for plant sizing.

6.3.5. Major HVAC Equipment – Design Description

6.3.5.1. System 1:

Based on the preliminary Design Calculations, the following major equipment components are proposed:

- 2 – 50 Ton air-cooled scroll chillers located outdoors on-grade sized to service a total building peak cooling load of 75 Tons. Operating one (1) chiller on emergency power will service the peak ‘critical equipment’ cooling load of approximately 50 Tons. Chilled water piping distribution to the main air handling unit chilled water coil and the future TRACON / Equipment Room CRAC units are served by a duplex set of chilled water variable speed pumps, sized at 100% flow each. These primary pumps will also serve the Tower four-pipe fan coils via a plate-type heat exchanger located on Level 2 (56 feet above grade) of the Tower to minimize system water pressure at the chiller plant.
- The main V.A.V. air handling unit serving the Base Building Administration area and Link will be sized at approximately 10,000 CFM and shall be complete with a 100% enthalpy controlled economizer, cooling coil, pre-heat coil and filter section.
- The main chilled water plant is sized to deliver chilled water to three (3) 15-Ton CRAC units (N + 1) for the fit-out of the future TRACON and Equipment Rooms. The units will be down-discharge airflow units (24” raised floor) complete with humidifiers and reheat.
- The heating load for the facility of approximately 380 MBH will be served by two (2) 300 MBH fully condensing gas-fired boilers.
- The Tower Cab and Equipment Levels will be served by four-pipe fan coil units complete with local minimum outdoor air intakes and electric / steam humidifiers. All critical areas will be provided with 100% standby equipment.
- A building direct digital control system will be provided with point selections in accordance with the Mechanical Engineering Design Guideline.

6.3.5.2. System 2 and System 3:

- These two HVAC options are modified versions of System 1. The 35% design submission will include a LCC evaluation and recommendation.

6.3.6. Energy Analysis

- A preliminary total building energy analysis for both gas and electricity is included in this submission using software Carrier E20-II, HAP Version 4.3 (2005) with actual utility rates. System 1 HVAC equipment selections were used for the energy simulation. Internal electronic equipment loads were simulated at 100% capacity under a 24 hour, 7 day schedule. The simulation model will be refined for all three (3) HVAC System types in the LCC analysis for final HVAC System type selection.



6.4. **Plumbing Systems**

6.4.1. **Domestic Water**

- A 4” municipal water connection for domestic water use will be fed from the 8” municipal water main to the east of the site on South Ulm St. The installation will be complete with shut off valve and water meter chamber to the local utility standard.
- The mechanical room will be the entry point for the water service. Domestic water piping throughout the Base Building will be at city water pressure and the Tower cold water delivered by a duplex booster pump system controlled by system pressure.
- Domestic hot water will be provided by electric point of use elements at each fixture.

6.4.2. **Sanitary Drainage**

- The sanitary drainage system for the facility will be connected to an 18” municipal connection manhole approximately 350 feet north of the building on West Harvard St.

6.4.3. **Storm Drainage**

- Scupper type roof drains will be provided for the Base Building and will be externally piped to grade. Tower roof drains (control flow) will be piped internal to grade. Total annual rainfall for Boise is 12” per year. There is no municipal storm drainage system.

6.4.4. **Plumbing Fixtures**

- Plumbing fixtures are shown on the architectural plans with quantities calculated as per the IBC with counts summarized as:

Water Closets	6
Lavatory Sinks	6
Urinals	1
Showers	2
Kitchen Sinks	3

- (equal women’s and men’s fixture counts (except urinals) for washrooms.)



6.5. Preliminary Total Building Energy Analysis

6.5.1. V.A.V. System Calculation

6.5.1.1.V.A.V. System Input Data

1. General Details:  
Air System Name ..... VAV  
Equipment Type ..... Chilled Water AHU  
Air System Type ..... VAV  
Number of zones ..... 1

2. System Components:  
Ventilation Air Data:  
Airflow Control ..... Proportional  
Ventilation Sizing Method ..... Sum of Space OA Airflows  
Minimum Airflow ..... 0 %  
Unocc. Damper Position ..... Closed  
Damper Leak Rate ..... 0 %  
Outdoor Air CO2 Level ..... 400 ppm

Preheat Coil Data:  
Setpoint ..... 50.0 °F  
Heating Source ..... Hot Water  
Schedule ..... JFMAMJJASOND  
Coil position ..... Downstream of Mixing Point

Central Cooling Data:  
Supply Air Temperature ..... 55.0 °F  
Coil Bypass Factor ..... 0.100  
Cooling Source ..... Chilled Water  
Schedule ..... JFMAMJJASOND  
Capacity Control ..... Constant Temperature - Fan On

Supply Fan Data:  
Fan Type ..... Forward Curved  
Configuration ..... Draw-thru  
Fan Performance ..... 0.00 in wg  
Overall Efficiency ..... 54 %

% Airflow	100	90	80	70	60	50
% kW	100	91	81	72	61	54

Duct System Data:  
Supply Duct Data:  
Duct Heat Gain ..... 0 %  
Duct Leakage ..... 0 %

Return Duct or Plenum Data:  
Return Air Via ..... Ducted Return

3. Zone Components:  
Space Assignments:

Zone 1: Zone 1	
BASEBUILDING	x1
Link to Tower	x1

Thermostats and Zone Data:  
Zone ..... All  
Cooling T-stat: Occ. .... 72.0 °F  
Cooling T-stat: Unocc. .... 85.0 °F  
Heating T-stat: Occ. .... 68.0 °F  
Heating T-stat: Unocc. .... 60.0 °F  
T-stat Throttling Range ..... 3.00 °F  
Diversity Factor ..... 100 %  
Direct Exhaust Airflow ..... 0.0 CFM  
Direct Exhaust Fan kW ..... 0.0 kW

Thermostat Schedule ..... tstat  
Unoccupied Cooling is ..... Available

Supply Terminals Data:  
Zone ..... All  
Terminal Type ..... VAV box with RH  
Minimum Airflow ..... 0.00 CFM/person

Reheat Coil Source ..... Electric Resistance  
Reheat Coil Schedule ..... JFMAMJJASOND

Zone Heating Units:  
Zone ..... All  
Zone Heating Unit Type ..... None

Zone Unit Heat Source ..... Hot Water  
Zone Heating Unit Schedule ..... JFMAMJJASOND

4. Sizing Data (Computer-Generated):  
System Sizing Data:  
Cooling Supply Temperature ..... 55.0 °F  
Supply Fan Airflow ..... 12595.0 CFM  
Ventilation Airflow ..... 600.0 CFM

Hydronic Sizing Specifications:  
Chilled Water Delta-T ..... 10.0 °F  
Hot Water Delta-T ..... 20.0 °F

Safety Factors:  
Cooling Sensible ..... 0 %  
Cooling Latent ..... 0 %  
Heating ..... 0 %

Zone Sizing Data:  
Zone Airflow Sizing Method ..... Peak zone sensible load  
Space Airflow Sizing Method ..... Individual peak space loads

Zone	Supply Airflow (CFM)	Zone Htg Unit (MBH)	Reheat Coil (MBH)	- (CFM)
1	12595.0	-	83.3	

5. Equipment Data  
No Equipment Data required for this system.

6.5.1.2.Zone Sizing Summary for V.A.V.

Air System Information  
Air System Name ..... VAV  
Equipment Class ..... CW AHU  
Air System Type ..... VAV  
Number of zones ..... 1  
Floor Area ..... 10093.0 ft²  
Location ..... Boise, Idaho

Sizing Calculation Information  
Zone and Space Sizing Method:  
Zone CFM ..... Peak zone sensible load  
Space CFM ..... Individual peak space loads  
Calculation Months ..... Jan to Dec  
Sizing Data ..... Calculated

Zone Sizing Data

	Maximum Cooling Sensible (MBH)	Design Air Flow (CFM)	Minimum Air Flow (CFM)	Time of Peak Load	Maximum Heating Load (MBH)	Zone Floor Area (ft²)	Zone CFM/ft²
Zone Name Zone 1	208.3	12595	600	Jul 1800	75.7	10093.0	1.25

Zone Terminal Sizing Data

	Reheat Coil Load (MBH)	Reheat Coil Water gpm @ 20.0 °F	Zone Htg Coil Load (MBH)	Zone Htg Water gpm @ 20.0 °F	Mixing Box Fan Airflow (CFM)
Zone Name Zone 1	83.3	-	0.0	0.00	0

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
Zone 1							
BASEBUILDING	1	204.6	Jul 1800	12372	69.5	9713.0	1.27
Link to Tower	1	4.1	Jul 0000	249	6.2	380.0	0.66

6.5.1.3.Air System Design Load Summary for V.A.V.

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1700 COOLING OA DB / WB 93.0 °F / 62.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 2.0 °F / 0.2 °F		
	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
ZONE LOADS						
Window & Skylight Solar Loads	420 ft²	23312	-	420 ft²	-	-
Wall Transmission	6203 ft²	7378	-	6203 ft²	22846	-
Roof Transmission	10093 ft²	14423	-	10093 ft²	28634	-
Window Transmission	420 ft²	4691	-	420 ft²	18021	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	312 ft²	1608	-	312 ft²	6178	-
Floor Transmission	10093 ft²	0	-	10093 ft²	0	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	12112 W	41324	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	31500 W	107478	-	0	0	-
People	30	7350	6150	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	-	207564	6150	-	75678	0
Zone Conditioning	-	201485	6150	-	70025	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	10653 CFM	0	-	600 CFM	0	-
Ventilation Load	507 CFM	9145	-6339	29 CFM	1759	0
Supply Fan Load	10653 CFM	0	-	600 CFM	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	210629	-189	-	71784	0
Central Cooling Coil	-	210629	0	-	4230	0
Preheat Coil	-	0	-	-	0	-
Terminal Reheat Coils	-	0	-	-	76014	-
>> Total Conditioning	-	210629	0	-	71784	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		



6.5.2. FC System Calculation

6.5.2.1.FC System Input Data

1. General Details:

Air System Name ..... FC  
Equipment Type ..... Terminal Units  
Air System Type ..... 4-Pipe Fan Coil  
Number of zones ..... 5  
Ventilation ..... Common Ventilation System

2. Ventilation System Components:

Ventilation Air Data:

Airflow Control ..... Constant Ventilation Airflow  
Ventilation Sizing Method ..... Sum of Space OA Airflows  
Unocc. Damper Position ..... Closed  
Damper Leak Rate ..... 0 %  
Outdoor Air CO2 Level ..... 400 ppm

Heating Coil Data:

Setpoint ..... 70.0 °F  
Heating Source ..... Hot Water  
Schedule ..... JFMAMJJASOND

Ventilation Fan Data:

Fan Type ..... Forward Curved  
Configuration ..... Draw-thru  
Fan Performance ..... 0.00 in wg  
Overall Efficiency ..... 54 %

% Airflow	100	90	80	70	60	50
% kW	100	91	81	72	61	54

% Airflow	40	30	20	10	0
% kW	46	40	33	27	21

Duct System Data:

Return Duct or Plenum Data:

Return Air Via ..... Ducted Return

3. Zone Components:

Space Assignments:

Zone 1: Zone 2	
TRACON & EQUIPMENT RM	x1
Zone 2: Zone 3	
Tower-base	x1
Zone 3: Zone 4	
Tower-Junction Level	x1
Zone 4: Zone 5	
Tower - Console Level	x1
Zone 5: Zone 6	
Tower - Control Cab	x1

Thermostats and Zone Data:

Zone ..... All  
Cooling T-stat: Occ. .... 72.0 °F  
Cooling T-stat: Unocc. .... 85.0 °F  
Heating T-stat: Occ. .... 68.0 °F  
Heating T-stat: Unocc. .... 60.0 °F  
T-stat Throttling Range ..... 3.00 °F

Thermostat Schedule ..... tstat  
Unoccupied Cooling is ..... Available

Common Terminal Unit Data:

Cooling Coil:

Design Supply Temperature ..... 55.0 °F  
Coil Bypass Factor ..... 0.100  
Cooling Source ..... Chilled Water

Schedule ..... JFMAMJJASOND

Heating Coil:

Design Supply Temperature ..... 110.0 °F  
Heating Source ..... Hot Water  
Schedule ..... JFMAMJJASOND

Fan Control ..... Fan On

Terminal Units Data:

Zone ..... All  
Terminal Type ..... Fan Coil  
Minimum Airflow ..... 0.00 CFM/person  
Fan Performance ..... 0.00 in wg  
Fan Overall Efficiency ..... 50 %

4. Sizing Data (Computer-Generated):

System Sizing Data:

Cooling Supply Temperature ..... 55.0 °F  
Heating Supply Temperature ..... 110.0 °F

Hydronic Sizing Specifications:

Chilled Water Delta-T ..... 10.0 °F  
Hot Water Delta-T ..... 20.0 °F

Safety Factors:

Cooling Sensible ..... 10 %  
Cooling Latent ..... 10 %  
Heating ..... 10 %

Zone Sizing Data:

Zone Airflow Sizing Method ..... Sum of space airflow rates  
Space Airflow Sizing Method ..... Individual peak space loads

Zone	Supply Airflow (CFM)	Zone Htg Unit (MBH)	Reheat Coil (MBH)	Ventilation (CFM)
1	21714.6	-	-	80.0
2	3782.2	-	-	0.0
3	5326.8	-	-	100.0
4	4658.9	-	-	0.0
5	6660.5	-	-	100.0

5. Equipment Data

No Equipment Data required for this system.



6.5.2.2.Zone Sizing Summary for FC

Air System Information

Air System Name .....	FC	Number of zones .....	5
Equipment Class .....	TERM	Floor Area .....	6628.0 ft²
Air System Type .....	4P-FC	Location .....	Boise, Idaho
Sizing Calculation Information			
Zone and Space Sizing Method:			
Zone CFM .....	Sum of space airflow rates	Calculation Months .....	Jan to Dec
Space CFM .....	Individual peak space loads	Sizing Data .....	Calculated

Zone Sizing Data

	Maximum Cooling Sensible (MBH)	Design Air Flow (CFM)	Minimum Air Flow (CFM)	Time of Peak Load	Maximum Heating Load (MBH)	Zone Floor Area (ft²)	Zone CFM/ft²
Zone Name							
Zone 2	359.1	21715	21715	Jul 0000	8.8	1867.0	11.63
Zone 3	62.5	3782	3782	Jul 1900	101.3	721.0	5.25
Zone 4	88.1	5327	5327	Aug 1500	14.7	2028.0	2.63
Zone 5	77.0	4659	4659	Sep 1500	10.8	1351.0	3.45
Zone 6	110.1	6660	6660	Aug 1600	57.4	661.0	10.08

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (MBH)	Sens Coil Load (MBH)	Coil Entering DB / WB (°F)	Coil Leaving DB / WB (°F)	Water Flow @ 10.0 °F (gpm)	Time of Peak Load
Zone 2	360.2	360.2	74.0 / 57.8	56.9 / 51.4	72.07	Jul 1600
Zone 3	57.8	57.8	74.3 / 59.2	58.6 / 53.4	11.57	Jul 1900
Zone 4	90.1	90.1	74.7 / 58.5	57.3 / 52.0	18.02	Aug 1400
Zone 5	76.9	76.9	74.2 / 58.9	57.3 / 52.6	15.39	Aug 1500
Zone 6	109.7	109.7	74.8 / 57.6	57.9 / 51.1	21.96	Aug 1600

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (MBH)	Heating Coil Ent/Lvg DB (°F)	Htg Coil Water Flow @20.0 °F (gpm)	Fan Design Airflow (CFM)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (CFM)
Zone 2	9.2	68.4 / 68.8	0.92	21715	0.000	0.000	80
Zone 3	97.7	66.0 / 92.5	9.78	3782	0.000	0.000	0
Zone 4	14.5	67.9 / 70.7	1.45	5327	0.000	0.000	100
Zone 5	10.8	68.1 / 70.5	1.08	4659	0.000	0.000	0
Zone 6	56.9	67.6 / 76.4	5.70	6660	0.000	0.000	100

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
Zone 2							
TRACON & EQUIPMENT RM	1	359.1	Jul 0000	21715	8.8	1867.0	11.63
Zone 3							
Tower-base	1	62.5	Jul 1900	3782	101.3	721.0	5.25
Zone 4							
Tower-Junction Level	1	88.1	Aug 1500	5327	14.7	2028.0	2.63
Zone 5							
Tower - Console Level	1	77.0	Sep 1500	4659	10.8	1351.0	3.45
Zone 6							
Tower - Control Cab	1	110.1	Aug 1600	6660	57.4	661.0	10.08

6.5.2.3.Air System Design Load Summary for FC

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1700			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 93.0 °F / 62.0 °F			HEATING OA DB / WB 2.0 °F / 0.2 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	1404 ft²	67731	-	1404 ft²	-	-
Wall Transmission	26351 ft²	56313	-	26351 ft²	104983	-
Roof Transmission	2528 ft²	3613	-	2528 ft²	7172	-
Window Transmission	1404 ft²	16471	-	1404 ft²	63278	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	2588 ft²	0	-	2588 ft²	0	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	4848 W	16541	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	134900 W	460277	-	0	0	-
People	14	3430	2870	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	10% / 10%	62438	287	10%	17543	0
>> Total Zone Loads	-	686814	3157	-	192977	0
Zone Conditioning	-	679079	3157	-	189653	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Exhaust Fan Load	280 CFM	0	-	280 CFM	0	-
Ventilation Load	280 CFM	5085	-1835	280 CFM	17949	7
Ventilation Fan Load	280 CFM	0	-	280 CFM	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	-	684163	1322	-	207603	7
Heating Coil	-	0	-	-	18520	-
Terminal Unit Cooling	-	684163	0	-	0	0
Terminal Unit Heating	-	0	-	-	189082	-
>> Total Conditioning	-	684163	0	-	207603	0
Key:	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

6.5.3. Space Input Data

6.5.3.1.Base Building

1. General Details:

Floor Area .....	9713.0	ft²
Avg. Ceiling Height .....	14.0	ft
Building Weight .....	70.0	lb/ft²
1.1. OA Ventilation Requirements:		
Space Usage .....	User-Defined	CFM/person
OA Requirement 1 .....	20.0	CFM/ft²
OA Requirement 2 .....	0.00	CFM/ft²
Space Usage Defaults .....	ASHRAE Std 62-2001	

2. Internals:

2.1. Overhead Lighting:		
Fixture Type .....	Recessed (Unvented)	
Wattage .....	1.20	W/ft²
Ballast Multiplier .....	1.00	
Schedule .....	Sample Schedule	

2.2. Task Lighting:

Wattage .....	0.00	W/ft²
Schedule .....	None	

2.3. Electrical Equipment:

Wattage .....	31500.0	Watts
Schedule .....	Sample Schedule	

3. Walls, Windows, Doors:

Exp.	Wall Gross Area (ft²)	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
NNW	1123.0	8	0	1
WSW	2022.0	9	0	6
SSE	1123.0	0	0	1
ENE	1289.4	4	0	5

3.1. Construction Types for Exposure NNW

Wall Type	Face Brick + R-14 Board + 8" HW Concrete Block
1st Window Type .....	4' W Standard Dbl Glazed
Door Type .....	Metal Door

3.2. Construction Types for Exposure WSW

Wall Type	Face Brick + R-14 Board + 8" HW Concrete Block
1st Window Type .....	4' W Standard Dbl Glazed
Door Type .....	Metal Door

3.3. Construction Types for Exposure SSE

Wall Type	Face Brick + R-14 Board + 8" HW Concrete Block
Door Type .....	Metal Door

3.4. Construction Types for Exposure ENE

Wall Type	Face Brick + R-14 Board + 8" HW Concrete Block
1st Window Type .....	4' W Standard Dbl Glazed
Door Type .....	Metal Door

4. Roofs, Skylights:

Exp.	Roof Gross Area (ft²)	Roof Slope (deg.)	Skylight Qty.
H	9713.0	0	0

4.1. Construction Types for Exposure H

Roof Type ..	Built-up Roof + R-14 Board + 8" LW Concrete
--------------	---

5. Infiltration:

Design Cooling .....	0.20	ACH
Design Heating .....	0.20	ACH
Energy Analysis .....	0.00	CFM

Infiltration occurs only when the fan is off.

6. Floors:

Type .....	Slab Floor On Grade	
Floor Area .....	9713.0	ft²
Total Floor U-Value .....	0.100	BTU/(hr-ft²-°F)
Exposed Perimeter .....	0.0	ft
Edge Insulation R-Value .....	0.00	(hr-ft²-°F)/BTU

7. Partitions:

(No partition data).



6.5.3.2. Equipment Room & Future TRAC ON

1. General Details:  
Floor Area ..... 1867.0   ft²  
Avg. Ceiling Height ..... 14.0   ft  
Building Weight ..... 70.0   lb/ft²

1.1. OA Ventilation Requirements:  
Space Usage ..... User-Defined  
OA Requirement 1 ..... 20.0   CFM/person  
OA Requirement 2 ..... 0.00   CFM/ft²  
Space Usage Defaults ..... ASHRAE Std 62-2001

2. Internals:  
2.1. Overhead Lighting:  
Fixture Type ..... Recessed (Unvented)  
Wattage ..... 0.00   W/ft²  
Ballast Multiplier ..... 1.00  
Schedule ..... None

2.2. Task Lighting:  
Wattage ..... 0.00   W/ft²  
Schedule ..... None

2.3. Electrical Equipment:  
Wattage ..... 94000.0   Watts  
Schedule ..... Sample Schedule

3. Walls, Windows, Doors:

Exp.	Wall Gross Area (ft²)	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
W	732.0	0	0	0

3.1. Construction Types for Exposure W  
Wall Type Face Brick + R-14 Board + 8" HW Concrete Block

Exp.	Roof Gross Area (ft²)	Roof Slope (deg.)	Skylight Qty.
H	1867.0	0	0

4.1. Construction Types for Exposure H  
Roof Type .. Built-up Roof + R-14 Board + 8" LW Concrete

5. Infiltration:  
Design Cooling ..... 0.20   ACH  
Design Heating ..... 0.20   ACH  
Energy Analysis ..... 0.00   CFM  
*Infiltration occurs only when the fan is off.*

6. Floors:  
Type ..... Slab Floor On Grade  
Floor Area ..... 1867.0   ft²  
Total Floor U-Value ..... 0.100   BTU/(hr·ft²·°F)  
Exposed Perimeter ..... 0.0   ft  
Edge Insulation R-Value ..... 0.00   (hr·ft²·°F)/BTU

7. Partitions:  
*(No partition data).*

6.5.3.3. Link to Tower

1. General Details:  
Floor Area ..... 380.0   ft²  
Avg. Ceiling Height ..... 14.0   ft  
Building Weight ..... 70.0   lb/ft²

1.1. OA Ventilation Requirements:  
Space Usage ..... User-Defined  
OA Requirement 1 ..... 20.0   CFM/person  
OA Requirement 2 ..... 0.00   CFM/ft²  
Space Usage Defaults ..... ASHRAE Std 62-2001

2. Internals:  
2.1. Overhead Lighting:  
Fixture Type ..... Recessed (Unvented)  
Wattage ..... 1.20   W/ft²  
Ballast Multiplier ..... 1.00  
Schedule ..... Sample Schedule

2.2. Task Lighting:  
Wattage ..... 0.00   W/ft²  
Schedule ..... None

2.3. Electrical Equipment:  
Wattage ..... 0.00   W/ft²  
Schedule ..... None

3. Walls, Windows, Doors:

Exp.	Wall Gross Area (ft²)	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
NNW	689.0	0	0	0
SSE	689.0	0	0	0

3.1. Construction Types for Exposure NNW  
Wall Type Face Brick + R-14 Board + 8" HW Concrete Block

3.2. Construction Types for Exposure SSE  
Wall Type Face Brick + R-14 Board + 8" HW Concrete Block

Exp.	Roof Gross Area (ft²)	Roof Slope (deg.)	Skylight Qty.
H	380.0	0	0

4.1. Construction Types for Exposure H  
Roof Type .. Built-up Roof + R-14 Board + 8" LW Concrete

5. Infiltration:  
Design Cooling ..... 0.20   ACH  
Design Heating ..... 0.20   ACH  
Energy Analysis ..... 0.00   CFM  
*Infiltration occurs only when the fan is off.*

6. Floors:  
Type ..... Slab Floor On Grade  
Floor Area ..... 380.0   ft²  
Total Floor U-Value ..... 0.100   BTU/(hr·ft²·°F)  
Exposed Perimeter ..... 0.0   ft  
Edge Insulation R-Value ..... 0.00   (hr·ft²·°F)/BTU

7. Partitions:  
*(No partition data).*

6.5.3.4. Tower First Level

1. General Details:  
Floor Area ..... 721.0   ft²  
Avg. Ceiling Height ..... 120.0   ft  
Building Weight ..... 70.0   lb/ft²

1.1. OA Ventilation Requirements:  
Space Usage ..... User-Defined  
OA Requirement 1 ..... 20.0   CFM/person  
OA Requirement 2 ..... 0.00   CFM/ft²  
Space Usage Defaults ..... ASHRAE Std 62-2001

2. Internals:  
2.1. Overhead Lighting:  
Fixture Type ..... Recessed (Unvented)  
Wattage ..... 0.00   W/ft²  
Ballast Multiplier ..... 1.00  
Schedule ..... None

2.2. Task Lighting:  
Wattage ..... 0.00   W/ft²  
Schedule ..... None

2.3. Electrical Equipment:  
Wattage ..... 0.00   W/ft²  
Schedule ..... None

3. Walls, Windows, Doors:

Exp.	Wall Gross Area (ft²)	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
NW	2855.0	0	0	0
N	2855.0	0	0	0
NE	2855.0	0	0	0
E	2855.0	0	0	0
SE	2855.0	0	0	0
S	2855.0	0	0	0
SW	2855.0	0	0	0
W	2855.0	0	0	0

3.1. Construction Types for Exposure NW  
Wall Type . Stucco + 4" HW Concrete Block + R-14 Board

3.2. Construction Types for Exposure N  
Wall Type . Stucco + 4" HW Concrete Block + R-14 Board

3.3. Construction Types for Exposure NE  
Wall Type . Stucco + 4" HW Concrete Block + R-14 Board

3.4. Construction Types for Exposure E  
Wall Type . Stucco + 4" HW Concrete Block + R-14 Board

3.5. Construction Types for Exposure SE  
Wall Type . Stucco + 4" HW Concrete Block + R-14 Board

3.6. Construction Types for Exposure S  
Wall Type . Stucco + 4" HW Concrete Block + R-14 Board

3.7. Construction Types for Exposure SW  
Wall Type . Stucco + 4" HW Concrete Block + R-14 Board

3.8. Construction Types for Exposure W  
Wall Type . Stucco + 4" HW Concrete Block + R-14 Board

4. Roofs, Skylights:  
*(No Roof or Skylight data).*

5. Infiltration:  
Design Cooling ..... 200.00   CFM  
Design Heating ..... 200.00   CFM  
Energy Analysis ..... 0.00   CFM  
*Infiltration occurs only when the fan is off.*

6. Floors:  
Type ..... Slab Floor On Grade  
Floor Area ..... 721.0   ft²  
Total Floor U-Value ..... 0.100   BTU/(hr·ft²·°F)  
Exposed Perimeter ..... 0.0   ft  
Edge Insulation R-Value ..... 0.00   (hr·ft²·°F)/BTU

7. Partitions:  
*(No partition data).*



6.5.3.5.Tower - Junction Level

1. General Details:

Floor Area2028.0ft²Avg. Ceiling Height12.8ftBuilding Weight70.0lb/ft²

1.1. OA Ventilation Requirements:

Space UsageUser-DefinedOA Requirement 120.0CFM/personOA Requirement 20.00CFM/ft²Space Usage DefaultsASHRAE Std 62-2001

2. Internals:

2.1. Overhead Lighting:

Fixture TypeRecessed (Unvented)Wattage1.20W/ft²Ballast Multiplier1.00ScheduleSample Schedule

2.2. Task Lighting:

Wattage0.00W/ft²ScheduleNone

2.3. Electrical Equipment:

Wattage17000.0WattsScheduleSample Schedule

2.4. People:

Occupancy5.0PeopleActivity LevelOffice WorkSensible245.0BTU/hr/personLatent205.0BTU/hr/personScheduleSample Schedule

2.5. Miscellaneous Loads:

Sensible0BTU/hrScheduleSample ScheduleLatent0BTU/hrScheduleNone

3. Walls, Windows, Doors:

Exp.	Wall Gross Area (ft²)	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
NW	173.0	0	0	0
N	333.0	0	0	0
NE	173.0	0	0	0
E	333.0	4	0	0
SE	173.0	0	0	0
S	333.0	4	0	0
SW	173.0	2	0	0
W	333.0	0	0	0

3.1. Construction Types for Exposure NW

Wall Type Face Brick + R-14 Board + 8" HW Concrete Block

3.2. Construction Types for Exposure N

Wall Type Face Brick + R-14 Board + 8" HW Concrete Block

3.3. Construction Types for Exposure NE

Wall Type Face Brick + R-14 Board + 8" HW Concrete Block

3.4. Construction Types for Exposure E

Wall Type Face Brick + R-14 Board + 8" HW Concrete Block1st Window Type3' W Dbl Glazed

3.5. Construction Types for Exposure SE

Wall Type Face Brick + R-14 Board + 8" HW Concrete Block

3.6. Construction Types for Exposure S

Wall Type Face Brick + R-14 Board + 8" HW Concrete Block1st Window Type3' W Dbl Glazed

3.7. Construction Types for Exposure SW

Wall Type Face Brick + R-14 Board + 8" HW Concrete Block1st Window Type3' W Dbl Glazed

3.8. Construction Types for Exposure W

Wall Type Face Brick + R-14 Board + 8" HW Concrete Block

4. Roofs, Skylights:

(No Roof or Skylight data).

5. Infiltration:

Design Cooling0.00CFMDesign Heating0.00CFMEnergy Analysis0.00CFMInfiltration occurs only when the fan is off.

6. Floors:

TypeFloor Above Conditioned Space(No additional input required for this floor type).

7. Partitions:

(No partition data).

6.5.3.6.Tower - Console Access Level

1. General Details:

Floor Area1351.0ft²Avg. Ceiling Height12.8ftBuilding Weight70.0lb/ft²

1.1. OA Ventilation Requirements:

Space UsageUser-DefinedOA Requirement 120.0CFM/personOA Requirement 20.00CFM/ft²Space Usage DefaultsASHRAE Std 62-2001

2. Internals:

2.1. Overhead Lighting:

Fixture TypeRecessed (Unvented)Wattage1.20W/ft²Ballast Multiplier1.00ScheduleSample Schedule

2.2. Task Lighting:

Wattage0.00W/ft²ScheduleNone

2.3. Electrical Equipment:

Wattage15500.0WattsScheduleSample Schedule

2.4. People:

Occupancy0.0PersonActivity LevelOffice WorkSensible245.0BTU/hr/personLatent205.0BTU/hr/personScheduleSample Schedule

2.5. Miscellaneous Loads:

Sensible0BTU/hrScheduleSample ScheduleLatent0BTU/hrScheduleNone

3. Walls, Windows, Doors:

Exp.	Wall Gross Area (ft²)	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
NW	89.8	0	0	0
N	174.0	0	0	0
NE	89.8	0	0	0
E	174.0	4	0	0
SE	89.8	0	0	0
S	174.0	4	0	0
SW	89.8	2	0	0
W	174.0	0	0	0

3.1. Construction Types for Exposure NW

Wall Type Face Brick + R-14 Board + 8" HW Concrete Block

3.2. Construction Types for Exposure N

Wall Type Face Brick + R-14 Board + 8" HW Concrete Block

3.3. Construction Types for Exposure NE

Wall Type Face Brick + R-14 Board + 8" HW Concrete Block

3.4. Construction Types for Exposure E

Wall Type Face Brick + R-14 Board + 8" HW Concrete Block1st Window Type3' W Dbl Glazed

3.5. Construction Types for Exposure SE

Wall Type Face Brick + R-14 Board + 8" HW Concrete Block

3.6. Construction Types for Exposure S

Wall Type Face Brick + R-14 Board + 8" HW Concrete Block1st Window Type3' W Dbl Glazed

3.7. Construction Types for Exposure SW

Wall Type Face Brick + R-14 Board + 8" HW Concrete Block1st Window Type3' W Dbl Glazed

3.8. Construction Types for Exposure W

Wall Type Face Brick + R-14 Board + 8" HW Concrete Block

4. Roofs, Skylights:

(No Roof or Skylight data).

5. Infiltration:

Design Cooling0.00CFMDesign Heating0.00CFMEnergy Analysis0.00CFMInfiltration occurs only when the fan is off.

6. Floors:

TypeFloor Above Conditioned Space(No additional input required for this floor type).

7. Partitions:

(No partition data).

6.5.3.7.Tower - Control Cab Level

1. General Details:

Floor Area9713.0ft²Avg. Ceiling Height14.0ftBuilding Weight70.0lb/ft²

1.1. OA Ventilation Requirements:

Space UsageUser-DefinedOA Requirement 120.0CFM/personOA Requirement 20.00CFM/ft²Space Usage DefaultsASHRAE Std 62-2001

2. Internals:

2.1. Overhead Lighting:

Fixture TypeRecessed (Unvented)Wattage1.20W/ft²Ballast Multiplier1.00ScheduleSample Schedule

2.2. Task Lighting:

Wattage0.00W/ft²ScheduleNone

2.3. Electrical Equipment:

Wattage31500.0WattsScheduleSample Schedule

2.4. People:

Occupancy30.0PeopleActivity LevelOffice WorkSensible245.0BTU/hr/personLatent205.0BTU/hr/personScheduleSample Schedule

2.5. Miscellaneous Loads:

Sensible0BTU/hrScheduleSample ScheduleLatent0BTU/hrScheduleNone

3. Walls, Windows, Doors:

Exp.	Wall Gross Area (ft²)	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
NNW	1123.0	8	0	1
WSW	2022.0	9	0	6
SSE	1123.0	0	0	1
ENE	1289.4	4	0	5

3.1. Construction Types for Exposure NNW

Wall Type Face Brick + R-14 Board + 8" HW Concrete Block1st Window Type4' W Standard Dbl GlazedDoor TypeMetal Door

3.2. Construction Types for Exposure WSW

Wall Type Face Brick + R-14 Board + 8" HW Concrete Block1st Window Type4' W Standard Dbl GlazedDoor TypeMetal Door

3.3. Construction Types for Exposure SSE

Wall Type Face Brick + R-14 Board + 8" HW Concrete BlockDoor TypeMetal Door

3.4. Construction Types for Exposure ENE

Wall Type Face Brick + R-14 Board + 8" HW Concrete Block1st Window Type4' W Standard Dbl GlazedDoor TypeMetal Door

4. Roofs, Skylights:

Exp.	Roof Gross Area (ft²)	Roof Slope (deg.)	Skylight Qty.
H	9713.0	0	0

4.1. Construction Types for Exposure H

Roof Type .. Built-up Roof + R-14 Board + 8" LW Concrete

5. Infiltration:

Design Cooling0.20ACHDesign Heating0.20ACHEnergy Analysis0.00CFMInfiltration occurs only when the fan is off.

6. Floors:

TypeSlab Floor On GradeFloor Area9713.0ft²Total Floor U-Value0.100BTU/(hr-ft²-°F)Exposed Perimeter0.0ftEdge Insulation R-Value0.00(hr-ft²-°F)/BTU

7. Partitions:

(No partition data).



6.5.4. Energy Cost Calculation

6.5.4.1. Annual Cost Summary

Table 1. Annual Costs

Component	BOISE ACTC (\$)
Air System Fans	0
Cooling	11,678
Heating	2,663
Pumps	65
Cooling Tower Fans	0
HVAC Sub-Total	14,406
Lights	5,401
Electric Equipment	52,994
Misc. Electric	0
Misc. Fuel Use	0
Non-HVAC Sub-Total	58,396
Grand Total	72,802

Table 2. Annual Cost per Unit Floor Area

Component	BOISE ACTC (\$/ft²)
Air System Fans	0.000
Cooling	0.698
Heating	0.159
Pumps	0.004
Cooling Tower Fans	0.000
HVAC Sub-Total	0.862
Lights	0.323
Electric Equipment	3.169
Misc. Electric	0.000
Misc. Fuel Use	0.000
Non-HVAC Sub-Total	3.492
Grand Total	4.354
Gross Floor Area (ft²)	16721.0
Conditioned Floor Area (ft²)	16721.0

Note: Values in this table are calculated using the Gross Floor Area.

Table 3. Component Cost as a Percentage of Total Cost

Component	BOISE ACTC (%)
Air System Fans	0.0
Cooling	16.0
Heating	3.7
Pumps	0.1
Cooling Tower Fans	0.0
HVAC Sub-Total	19.8
Lights	7.4
Electric Equipment	72.8
Misc. Electric	0.0
Misc. Fuel Use	0.0
Non-HVAC Sub-Total	80.2
Grand Total	100.0

6.5.4.2. Energy Budget by Energy Source

1. Annual Coil Loads

Component	Load (kBTU)	(kBTU/ft²)
Cooling Coil Loads	5,485,046	328.033
Heating Coil Loads	210,394	12.583
Grand Total	5,695,440	340.616

2. Energy Consumption by Energy Source

Component	Site Energy (kBTU)	Site Energy (kBTU/ft²)	Source Energy (kBTU)	Source Energy (kBTU/ft²)
HVAC Components				
Electric	1,093,819	65.416	1,093,819	65.416
Natural Gas	240,775	14.400	240,775	14.400
Fuel Oil	0	0.000	0	0.000
Propane	0	0.000	0	0.000
Remote Hot Water	0	0.000	0	0.000
Remote Steam	0	0.000	0	0.000
Remote Chilled Water	0	0.000	0	0.000
HVAC Sub-Total	1,334,594	79.816	1,334,594	79.816
Non-HVAC Components				
Electric	5,480,360	327.753	5,480,360	327.753
Natural Gas	0	0.000	0	0.000
Fuel Oil	0	0.000	0	0.000
Propane	0	0.000	0	0.000
Remote Hot Water	0	0.000	0	0.000
Remote Steam	0	0.000	0	0.000
Non-HVAC Sub-Total	5,480,360	327.753	5,480,360	327.753
Grand Total	6,814,954	407.569	6,814,954	407.569

Notes:

1. 'Cooling Coil Loads' is the sum of all air system cooling coil loads.
2. 'Heating Coil Loads' is the sum of all air system heating coil loads.
3. Site Energy is the actual energy consumed.
4. Source Energy is the site energy divided by the electric generating efficiency (100.0%).
5. Source Energy for fuels equals the site energy value.
6. Energy per unit floor area is based on the gross building floor area.  
Gross Floor Area ..... 16721.0 ft²  
Conditioned Floor Area ..... 16721.0 ft²

6.5.4.3. Energy Budget by System Component

1. Annual Coil Loads

Component	Load (kBTU)	(kBTU/ft²)
Cooling Coil Loads	5,485,046	328.033
Heating Coil Loads	210,394	12.583
Grand Total	5,695,440	340.616

2. Energy Consumption by System Component

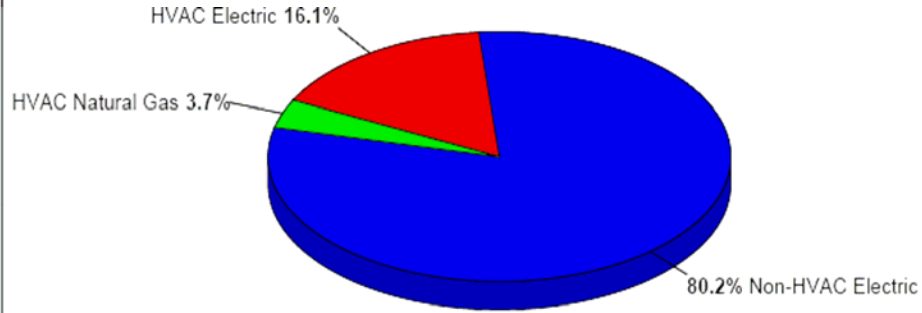
Component	Site Energy (kBTU)	Site Energy (kBTU/ft²)	Source Energy (kBTU)	Source Energy (kBTU/ft²)
Air System Fans	0	0.000	0	0.000
Cooling	1,087,635	65.046	1,087,635	65.046
Heating	240,775	14.400	240,775	14.400
Pumps	6,184	0.370	6,184	0.370
Cooling Towers	0	0.000	0	0.000
HVAC Sub-Total	1,334,594	79.815	1,334,594	79.815
Lights	506,906	30.316	506,906	30.316
Electric Equipment	4,973,521	297.442	4,973,521	297.442
Misc. Electric	0	0.000	0	0.000
Misc. Fuel Use	0	0.000	0	0.000
Non-HVAC Sub-Total	5,480,426	327.757	5,480,426	327.757
Grand Total	6,815,020	407.573	6,815,020	407.573

Notes:

1. 'Cooling Coil Loads' is the sum of all air system cooling coil loads.
2. 'Heating Coil Loads' is the sum of all air system heating coil loads.
3. Site Energy is the actual energy consumed.
4. Source Energy is the site energy divided by the electric generating efficiency (100.0%).
5. Source Energy for fuels equals the site energy value.
6. Energy per unit floor area is based on the gross building floor area.  
Gross Floor Area ..... 16721.0 ft²  
Conditioned Floor Area ..... 16721.0 ft²



6.5.4.4. Annual Energy Costs



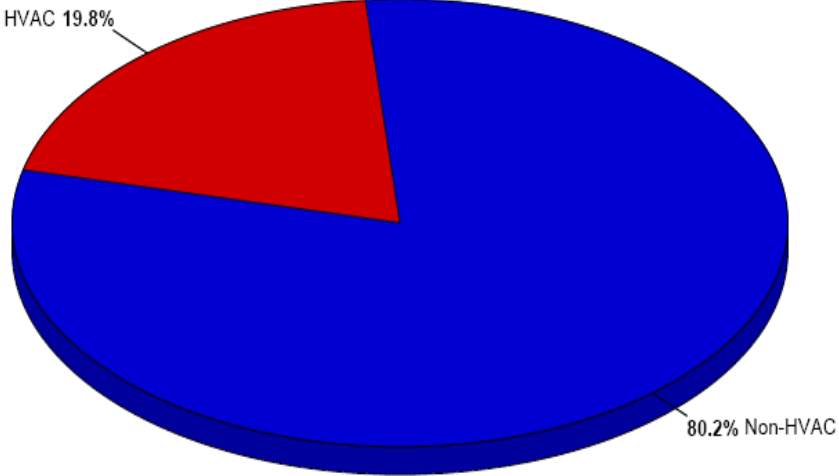
1. Annual Costs

Component	Annual Cost (\$/yr)	(\$/ft²)	Percent of Total (%)
HVAC Components			
Electric	11,743	0.702	16.1
Natural Gas	2,663	0.159	3.7
Fuel Oil	0	0.000	0.0
Propane	0	0.000	0.0
Remote Hot Water	0	0.000	0.0
Remote Steam	0	0.000	0.0
Remote Chilled Water	0	0.000	0.0
HVAC Sub-Total	14,406	0.862	19.8
Non-HVAC Components			
Electric	58,395	3.492	80.2
Natural Gas	0	0.000	0.0
Fuel Oil	0	0.000	0.0
Propane	0	0.000	0.0
Remote Hot Water	0	0.000	0.0
Remote Steam	0	0.000	0.0
Non-HVAC Sub-Total	58,395	3.492	80.2
Grand Total	72,801	4.354	100.0

Note: Cost per unit floor area is based on the gross building floor area.

Gross Floor Area ..... 16721.0 ft²  
Conditioned Floor Area ..... 16721.0 ft²

6.5.4.5. Annual HVAC & Non-HVAC Costs



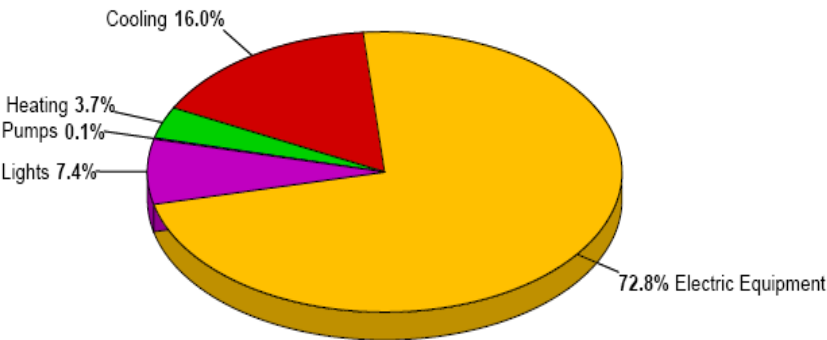
1. Annual Costs

Component	Annual Cost (\$/yr)	(\$/ft²)	Percent of Total (%)
HVAC	14,406	0.862	19.8
Non-HVAC	58,396	3.492	80.2
Grand Total	72,802	4.354	100.0

Note: Cost per unit floor area is based on the gross building floor area.

Gross Floor Area ..... 16721.0 ft²  
Conditioned Floor Area ..... 16721.0 ft²

6.5.4.6. Annual Component Cost



1. Annual Costs

Component	Annual Cost (\$)	(\$/ft²)	Percent of Total (%)
Air System Fans	0	0.000	0.0
Cooling	11,678	0.698	16.0
Heating	2,663	0.159	3.7
Pumps	65	0.004	0.1
Cooling Tower Fans	0	0.000	0.0
HVAC Sub-Total	14,406	0.862	19.8
Lights	5,401	0.323	7.4
Electric Equipment	52,994	3.169	72.8
Misc. Electric	0	0.000	0.0
Misc. Fuel Use	0	0.000	0.0
Non-HVAC Sub-Total	58,396	3.492	80.2
Grand Total	72,802	4.354	100.0

Note: Cost per unit floor area is based on the gross building floor area.

Gross Floor Area ..... 16721.0 ft²  
Conditioned Floor Area ..... 16721.0 ft²

End of Section



7. ELECTRICAL DESIGN BASIS

7.1. General

- The electrical engineering for the new ATCT and Base Building shall be designed per the following design guides and codes:
  - International Building Code, 2003
  - ATCT Facility Design Guide, FAA Order 6480.7D
  - National Electrical Code, 2003
  - FAA Standard 019e – Lightning and Surge Protection, Grounding, Bonding and shielding requirements for Facilities and Electronic Equipment.

7.2. Primary Distribution System

1. The primary source of electrical power for this project will derived from the existing 34.5 KV overhead distribution that is installed on the north side of West Gowan Road. This distribution presently feeds a platform-mounted bank of three 500 KVA transformers located on the west side of S. Ulm Street close to West Gowan Road. The 12.5 KV distribution provided by this transformer bank supplies an overhead distribution that extends north, adjacent to the proposed site and dips underground d to service buildings at the east end of the runways.
2. The existing facility on the proposed site is supplied from the 12.5 KV distribution and utilizes a pole-mounted bank of three 167 KVA transformers. This tap is brought overhead from S. Ulm Street via an intermediate pole and the service to the existing building is provided by an underground conduit system.
3. Idaho Power has indicated that the demand on the bank of 500 KVA transformers is currently very light. Although the service demand of the proposed construction is equal to the present service, Idaho Power has indicated that they would like to replace and upgrade the conductors for the 12.5 KV overhead distribution along S. Ulm Street.

4. Karl Peck of Idaho Power has confirmed that the available fault circuit current available at the point of supply is 39,486A.
5. The new service will employ a new pole at S. Ulm Street that will support an underground dip to a new 500 KVA pad-mounted transformer supplied and installed by Idaho Power. Metering will be installed by Idaho Power at the transformer. The electrical contractor will be responsible for installing an underground concrete-encased schedule 40 PVC duct system to the main switchboard.
6. The main distribution for the building will be 600A 277/480V. The secondary voltage is selected since it is the primary nominal building distribution voltage throughout the United States.
7. All design with respect to voltage drop, physical characteristics of circuits, clearances, etc. will be in accordance with NFPA 70, the National Electrical Code, latest edition.
8. The anticipated total electrical load for mechanical services for the building is as follows:

Equipment	Quantity	Rating	Kw
50 Ton Chillers	2	460/60/3 98 MCA	162
Air Handling Unit No. 1	1	15HP & 5HP	28
15 Ton Computer Room A/C Units	3	5 HP & 10 KW	54
Tower Fan Coil Units	6	2 HP	21
Miscellaneous Fans	4	1 HP	7
Hydronic Pumps	4	5.0 to 7.5 HP	40
Fire Pump	1	50 HP	68
Total			380

9. The hydronic pumps are installed as alternating units and only two of the four pumps will operate at any time.
10. Operation of the fire pump will be in conjunction with fire alarm condition. In fire alarm condition one chiller will be shut down. This condition would result in a total connected mechanical load of 279 KW. Since the fire pump will be VFD controlled, this value could be much lower.
11. During normal operation the chillers should operate at a maximum load of 75 tons, yielding a total connected demand load of 252 KW.
12. The calculation above excludes the option of electric heating. Should this option be taken, the design would ensure that the electrical heating load does not exceed the cooling load. Since these loads are non-concurrent, the electrical heating load is excluded from these calculations.
13. The total lighting load, based on a total floor area (including base building, and all tower levels) of approximately 13,000 sqft and an average load of 1.25 watts/sqft is 17 KW.



14. The anticipated total electrical load for electronics components for the building is as follows. Equipment for which no specific electrical loads have been provided are indicated with an asterisk:

EQUIPMENT	QUANTITY	RATING (KW)	TOTAL (KW)
STARS	2	9	18
EFSTS	1	2*	2
FDIO	1	1*	1
IDS	3	0.5*	1.5
DVRS	18	0.4	7.2
R/T	48	0.1*	4.8
RCE	14	0.1*	1.4
TVS	1	2*	2
BVS	1	1*	1
ASOS	1	0.5*	.5
ATIS	2	0.5*	1
DASI	2	0.2*	.4
LG	2	0.1*	.2
TCD	2	0.1*	.2
CCTV	1	0.5	.5
TELCO	Lot	1.2	1.2
LAN/WAN	Lot	1	1
Total			43.9

15. An additional allowance of 20 KW for general purpose outlets is also included.
16. The total connected load for the building is therefore approximated at 340 KW or 330A at 277/480V.
17. The switchgear for the facility will be based on a 600A distribution at 277/480V and specified as Square D. A main switchboard will provide power through the building transfer switch to the main distribution panel as well as power to the fire pump transfer switch.

18. Distribution throughout the building will be in accordance with the attached single-line drawing and will be fully coordinated using the services of Power Systems Engineering of Seattle. Distribution will be designed to ensure that all equipment is rated for the available fault currents and to ensure that upstream tripping of overcurrent devices will not occur.

7.3. Lighting Systems

1. Lighting systems will adhere to ASHRAE and IEEE standards for energy efficiency and all spaces will be evaluated using Visual Basic 2.05 software.
2. Lighting sources will be based primarily on fluorescent T8 lamps with minimum CRI 86. Color temperature will be as specified by the client.
3. Ballasts will be high frequency electronic with less than 10 percent total harmonic distortion and power factor close to unity.
4. A lighting control system will be implemented to ensure that no unoccupied areas are illuminated unnecessarily.

7.4. Power Systems

1. A diesel-fired 300 KW generator will be provided for emergency power for the building. Output from this generator will be supplied to the main distribution via a 600A transfer switch as well as to the fire pump via its dedicated transfer switch. The generator will be installed in a dedicated room and provided with a day tank. A main fuel tank and load bank will be installed at the exterior of the building.
2. The entire building electrical distribution will be connected to the load side of the building transfer switch. A lower priority “non-essential” distribution will be supplied by a shunt trip circuit breaker from this distribution. This arrangement will allow a means of load-shedding should the generator become overloaded and will ensure that the “essential” distribution remains energized. In addition, one chiller will be shut down when the building is supported by generator power.

3. The UPS will be specified as a 100 KVA double-conversion Mitsubishi system using valve-regulated lead-acid batteries installed in a cabinet sized to match the dimensions of the UPS cabinet. No battery room is therefore required. The UPS will be provided with a main feeder as well as a static switch feeder from the main distribution.
4. A maintenance bypass switch with key-interlocks will be provided for the UPS system. This system will be provided with a separate feeder from the main distribution.

7.5. Emergency Lighting

1. All lighting will be on emergency power with the proposed distribution arrangement. Selected lighting fixtures will be connected to separate circuits in the essential distribution system to ensure illumination of the means of egress.
2. An emergency lighting battery unit will be provided to illuminate the generator room as well as the transfer switch location in the event of the generator failing to start on normal power failure.

7.6. Grounding Systems

1. The entire project will be installed in compliance with FAA Standard 019e – *Lightning And Surge Protection, Grounding, Bonding And Shielding Requirements For Facilities And Electronic Equipment*.

7.7. Communications Systems

1. The installed telephone system will provide all communications and paging within the facility.

7.8. Other Systems

1. The fire alarm system will be provided as a performance specification only. Specification is to be provided by FAA.
2. The CCTV and Security systems are to be provided as performance specifications only. Specifications to be provided by FAA.

End of Section



8. FIRE PROTECTION DESIGN BASIS

8.1. General

- The Fire Protection Engineering for the new ATCT and Base Building shall be designed per the following design guides and codes:
  - International Building Code, 2003
  - International Fire Code, 2003
  - NFPA 101 - Life Safety Design
- The International Building Code shall govern for all issues related to the design, construction, and occupancy of all ATCT and Base Building, with the exception of the ATCT means of egress. Due to a special agreement between OSHA and the FAA that requires compliance with 29 CFR 1960.20, "Alternate Emergency Egress Standard for ATCT", NFPA 101 shall govern for those issues related to construction of and egress from the ATCT. *Only one exit stairway will be provided for the new ATCT with the elevator constructed as the second means of egress.*

8.2. Building Code Analysis

- A detail Building Code Analysis and Fire Safety Plans have been provided for the ATCT and Base Building on the following drawings:
  - Base Building: NM-D-ATCT-BF01 to BF02
  - ATCT: NM-D-ATCT-TF01 to TF06

8.3. Sprinkler Design Considerations

- A dedicated 6" fire line connection will be made next to the domestic water connection at the 8" main on South Ulm St. The service of the line is for the total facility wet-pipe sprinkler system designed to NFPA standards and the Tower standpipe system designed to NFPA with the standpipe Class and category to the approval of the local fire department.
- A ULC listed fire pump will be designed for the Tower sprinkler and standpipe system, as required, to provide adequate water pressure (max. 175 psig) and flow to meet the system requirements. The fire pump will be fed from the emergency power generator and will be located at Level 2 of the Tower approx. 56 feet above grade to reduce the pump pressure requirement to serve the top of the Tower. The pump size is estimated at 50 HP. A city water flow test at the street water main will be conducted for final pump sizing prior to 100% design submission.
- At least one (1) site fire hydrant will be required to meet NFPA and local fire department requirements. Site hydrants are required to have separate connections at the municipal main.
- Pre-action type sprinkler systems are **not** required for electronic equipment rooms.
- The kitchen / breakroom range hood installation will include an automatic chemical extinguishing system to FAA specifications.

End of Section



9. PROJECT SCHEDULE & COST ESTIMATE

9.1. General

- The design schedule for completing all tasks included in the contract shall be two hundred and seven three calendar days (273) from the Notice to Proceed (NTP). It is critical to complete the project design and issue for bidding by September 2007.

9.2. Design Submittal Milestone

- The following deliverable schedule has been set as below:
  - PPD Submittal                      January 26, 2007
  - 35% Submittal                      April 03, 2007
  - 65% Informal Submittal        June 1, 2007
  - 100% Submittal                    July 09, 2007
  - Complete Bid Documents        August 30, 2007

9.3. Construction Bidding and Schedule:

- FAA has allotted one hundred and five calendar days (105) for logistics and bidding. It is anticipated to proceed on the earlier date of September 16, 2007 or when the project design is completed.
- A typical construction schedule for this type of facility is 20 to 24 months. FAA has allotted six hundred and thirty seven calendar days (637) for this project.

9.4. Cost Estimate

- A detailed estimate of the Construction for this project will be prepared after the review comments received from the PPD reviewed and the various proposed systems are approved to be used for the project.
- It will be ready for the 35% Design Submittal





**ARCHITECTURAL RENDERING**

**AIRPORT TRAFFIC CONTROL  
TOWER (ATCT) AND BASE  
BUILDING SITE ADAPTATION  
DESIGN PROJECT**

**BOISE AIPORT,  
IDAHO**





DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
NORTHWEST MOUNTAIN REGION  
RENTON, WASHINGTON



BOISE McGOWEN FIELD AIRPORT  
BOISE, IDAHO  
TRAFFIC CONTROL TOWER (ATCT) AND  
BASE BUILDING SITE ADAPTATION  
DESIGN PROJECT

PROJECT PLANNING DOCUMENT  
JANUARY 26, 2007

LIST OF DRAWINGS

NM-D-ATCT-G00	COVER
NM-D-ATCT-SC01	FACILITIES LAYOUT PLAN
NM-D-ATCT-SC02	SITE PLAN
NM-D-ATCT-BA01	BASE BUILDING - FLOOR PLAN
NM-D-ATCT-BA02	BASE BUILDING - EXTERIOR ELEVATIONS
NM-D-ATCT-BA03	BASE BUILDING - BUILDING SECTION
NM-D-ATCT-BF01	BASE BUILDING - BASIS OF DESIGN
NM-D-ATCT-BF02	BASE BUILDING - FIRE SAFETY PLAN
NM-D-ATCT-TA01	INTERMEDIATE ACTIVITY TOWER - FLOOR LEVEL 1-9
NM-D-ATCT-TA02	INTERMEDIATE ACTIVITY TOWER - INTERMEDIATE & SUBJUNCTION LEVELS
NM-D-ATCT-TA03	INTERMEDIATE ACTIVITY TOWER - JUNCTION LEVEL
NM-D-ATCT-TA04	INTERMEDIATE ACTIVITY TOWER - CONSOLE ACCESS LEVEL
NM-D-ATCT-TA05	INTERMEDIATE ACTIVITY TOWER - FLOOR PLAN - 525 SF CAB
NM-D-ATCT-TA06	INTERMEDIATE ACTIVITY TOWER - CONTROL CAB - BDI 8-22-06 SIMULATION
NM-D-ATCT-TA07	INTERMEDIATE ACTIVITY TOWER - EXTERIOR ELEVATION
NM-D-ATCT-TA08	INTERMEDIATE ACTIVITY TOWER - SECTION
NM-D-ATCT-TF01	INTERMEDIATE ACTIVITY TOWER - BASIS OF DESIGN
NM-D-ATCT-TF02	INTERMEDIATE ACTIVITY TOWER - FIRE SAFETY PLANS - LEVEL 1-9
NM-D-ATCT-TF03	INTERMEDIATE ACTIVITY TOWER - INTERMEDIATE & SUBJUNCTION LEVELS
NM-D-ATCT-TF04	INTERMEDIATE ACTIVITY TOWER - FIRE SAFETY - JUNCTION LEVEL
NM-D-ATCT-TF05	INTERMEDIATE ACTIVITY TOWER - FIRE SAFETY PLAN - CONSOLE ACCESS LEVEL
NM-D-ATCT-TF06	INTERMEDIATE ACTIVITY TOWER - FIRE SAFETY PLAY - FLOOR PLAN - 525 SF CAB
NM-D-ATCT-BE09	SINGLE-LINE POWER RISER



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NM-D-ATCT-G00





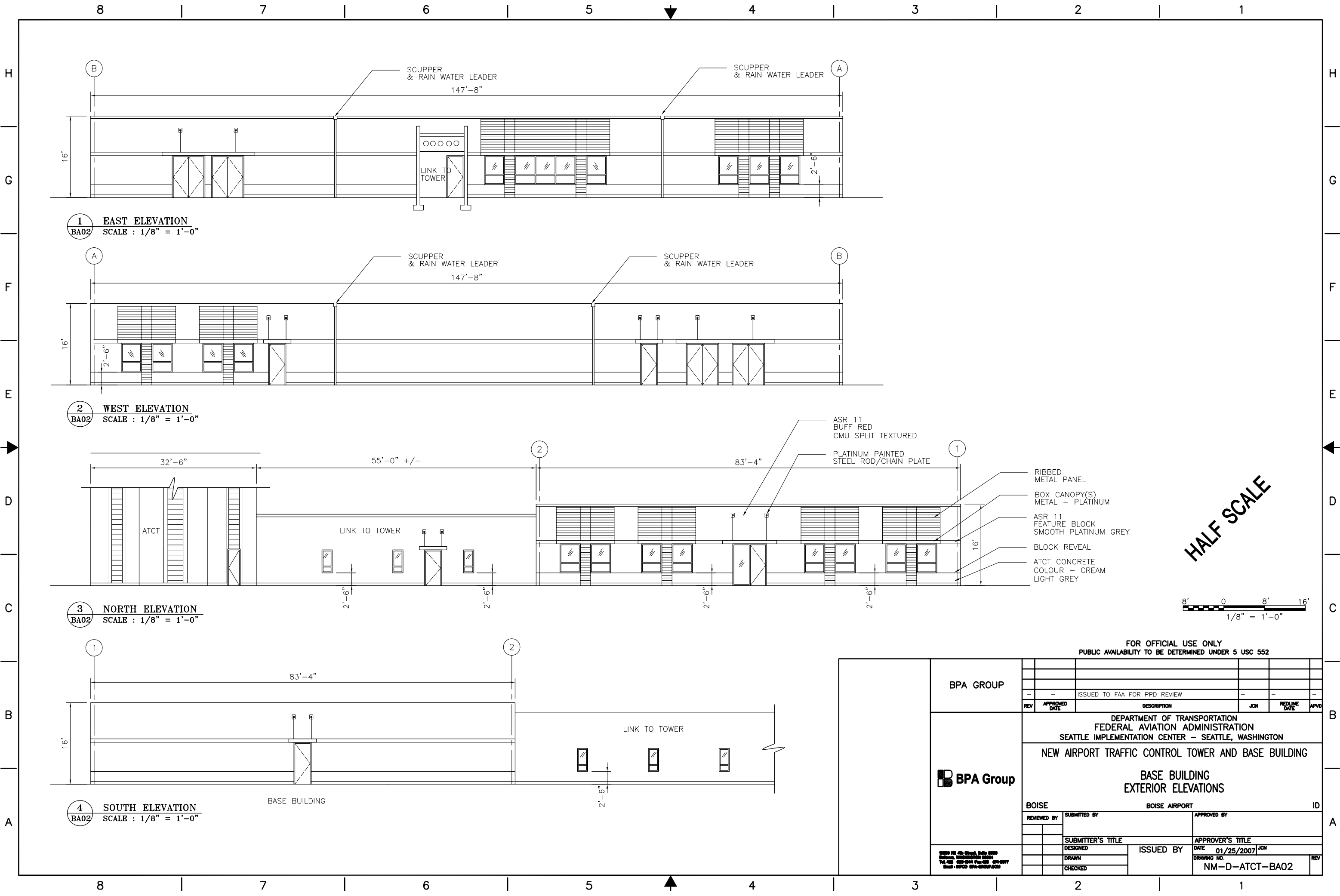












1 EAST ELEVATION  
BA02 SCALE : 1/8" = 1'-0"

2 WEST ELEVATION  
BA02 SCALE : 1/8" = 1'-0"

3 NORTH ELEVATION  
BA02 SCALE : 1/8" = 1'-0"

4 SOUTH ELEVATION  
BA02 SCALE : 1/8" = 1'-0"

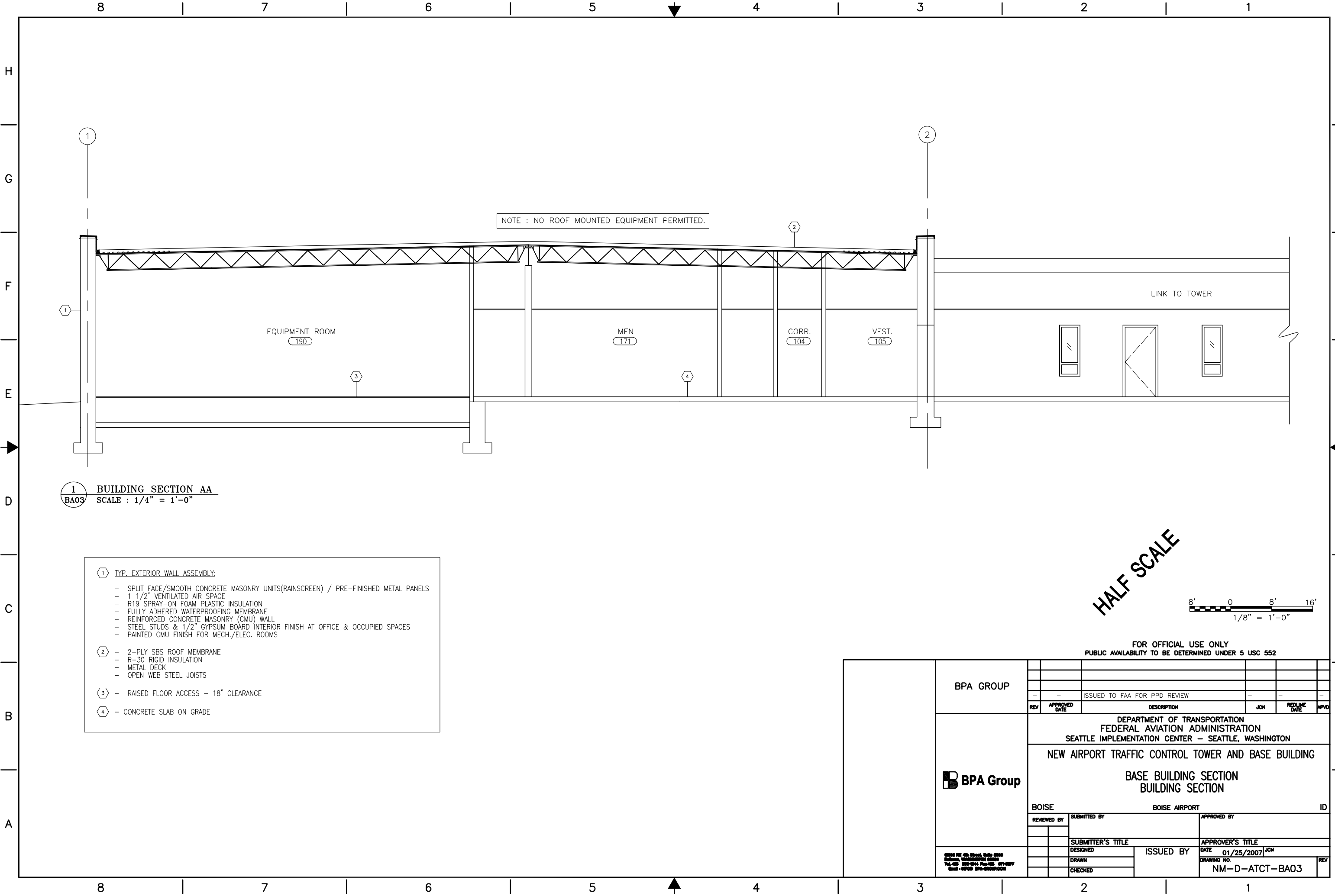
8' 0 8' 16'  
1/8" = 1'-0"

HALF SCALE

FOR OFFICIAL USE ONLY  
PUBLIC AVAILABILITY TO BE DETERMINED UNDER 5 USC 552

BPA GROUP		REV	APPROVED DATE	ISSUED TO FAA FOR PPD REVIEW	JCN	REDLINE DATE	APVD
		REV	APPROVED DATE	ISSUED TO FAA FOR PPD REVIEW	JCN	REDLINE DATE	APVD
BPA Group		DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION SEATTLE IMPLEMENTATION CENTER - SEATTLE, WASHINGTON					
		NEW AIRPORT TRAFFIC CONTROL TOWER AND BASE BUILDING					
BOISE		BASE BUILDING EXTERIOR ELEVATIONS					
		BOISE AIRPORT					
BOISE		ID					
		SUBMITTED BY					
BOISE		APPROVED BY					
		SUBMITTER'S TITLE					
BOISE		APPROVER'S TITLE					
		DESIGNED					
BOISE		ISSUED BY					
		DRAWING NO.					
BOISE		CHECKED					
		DATE 01/25/2007					
BOISE		NM-D-ATCT-BA02					
		REV					







## BASIS OF DESIGN

## I. FACILITY DEFINITION

BASE BUILDINGS ARE IDENTIFIED AS ADMINISTRATIVE (NON-TRACON) BASE BUILDINGS AND TRACON BASE BUILDINGS AND ARE CLASSIFIED INTO SIZES BASED ON THE NUMBER OF PERSONNEL THE FACILITY IS EXPECTED TO ACCOMMODATE AS WELL AS THE FOOTPRINT AND CLEARANCES REQUIRED BY THE EQUIPMENT.

AREAS WITHIN THE BASE BUILDINGS ARE GROUPED BASED ON ACTIVITY AND CLASSIFIED BY ACTIVITY MODULE. THE ACTIVITY MODULE GROUPS ARE AS FOLLOWS:

- AIR TRAFFIC (INCLUDING OPERATIONAL AND GENERAL ADMINISTRATION OFFICES)
- AIRWAY FACILITIES (INCLUDING OPERATIONAL AND GENERAL ADMINISTRATION OFFICES)
- MECHANICAL/ELECTRICAL SUPPORT
- EQUIPMENT AREAS WITH SHOP AND STORAGE

SQUARE FOOT SPACE REQUIREMENTS FOR ROOMS WITHIN EACH ACTIVITY MODULE WERE ESTABLISHED BY THE FEDERAL AVIATION ADMINISTRATION ATO ON APRIL 27, 2004.

## II. CODES OF RECORD

THE DESIGN AND CONSTRUCTION OF THE BASE BUILDING SHALL COMPLY WITH THE REQUIREMENTS OF THE INTERNATIONAL BUILDING CODE (IBC), 2003 EDITION AND NFPA 101, THE LIFE SAFETY CODE (LSC), 2003 EDITION. WHERE THE IBC AND NFPA 101 HAVE CONFLICTING REQUIREMENTS, THE MORE RESTRICTIVE CODE SHALL TAKE PRECEDENCE.

THE FOLLOWING DOCUMENTS WILL PROVIDE THE CRITERIA WHICH WILL GOVERN THE FIRE PROTECTION AND LIFE SAFETY DESIGN OF THE FACILITY.

- A. INTERNATIONAL BUILDING CODE (IBC), 2003 EDITION.
- B. INTERNATIONAL FIRE CODE (IFC), 2003 EDITION.
- C. NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 10 (NFPA 10), STANDARD FOR PORTABLE FIRE EXTINGUISHERS, 2002 EDITION.
- D. NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 13 (NFPA 13), STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS, 2002 EDITION.
- E. NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 20 (NFPA 20), STANDARD FOR THE INSTALLATION OF STATIONARY PUMPS FOR FIRE PROTECTION, 2003 EDITION.
- F. NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 24 (NFPA 24), STANDARD FOR THE INSTALLATION OF PRIVATE FIRE SERVICE MAINS AND THEIR APPURTENANCES, 2002 EDITION.
- G. NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 70 (NFPA 70), NATIONAL ELECTRICAL CODE, 2002 EDITION.
- H. NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 72 (NFPA 72), NATIONAL FIRE ALARM CODE, 2002 EDITION.
- I. NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 75 (NFPA 75), STANDARD FOR THE PROTECTION OF INFORMATION TECHNOLOGY EQUIPMENT, 2003 EDITION.
- J. NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 90A (NFPA 90A), STANDARD FOR THE INSTALLATION OF AIR-CONDITIONING AND VENTILATING SYSTEMS, 2002 EDITION.
- K. NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 92A (NFPA 92A), RECOMMENDED PRACTICE FOR SMOKE CONTROL SYSTEMS, 2003 EDITION.
- L. NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 101 (NFPA 101), THE LIFE SAFETY CODE, 2003 EDITION.

### III. USE & OCCUPANCY CLASSIFICATION

- A. BUSINESS (IBC SECTION 304)
- B. NEW BUSINESS (NFPA 101, SECTION 38.1.1.1)

#### IV. SPECIAL DETAILED REQUIREMENTS BASED ON USE AND OCCUPANCY

INTERNATIONAL BUILDING CODE (IBC SECTION 304) - THIS BASE BUILDING IS CLASSIFIED AS A BUSINESS OCCUPANCY IN ACCORDANCE WITH THE REQUIREMENTS OF THE IBC. THE BASE BUILDING IS DESIGNED TO SERVE AN OCCUPANT LOAD OF 100 SQUARE FEET PER PERSON IN ACCORDANCE WITH IBC TABLE 1004.1.2.

LIFE SAFETY CODE (NFPA 101 SECTION 38.1.1.1) - THIS BASE BUILDING IS CLASSIFIED AS A BUSINESS OCCUPANCY (GROUP B) IN ACCORDANCE WITH THE REQUIREMENTS OF THE LSC. THE BASE BUILDING IS DESIGNED TO SERVE AN OCCUPANT LOAD OF 100 SUARE FEET PER PERSON PER NFPA 101 TABLE 7.3.1.2.

## V. GENERAL BUILDING HEIGHT AND AREA

- A. ALLOWABLE HEIGHT (IBC SECTION 503)
- |                    |           |
|--------------------|-----------|
| MAXIMUM PERMITTED: | 3 STORIES |
| PROVIDED:          | 1 STORY   |
- B. ALLOWABLE AREA (IBC TABLE 503)
- |                    |  |
|--------------------|--|
| MAXIMUM PERMITTED: | 18,000 SQUARE FEET (BASE ALLOWABLE AREA) |
| PROVIDED:          | 12,300 SQUARE FEET                       |

## VI. TYPE OF CONSTRUCTION

- A. CONSTRUCTION TYPE (IBC TABLE 503)  
MINIMUM REQUIRED: V  
PROVIDED: IIB

## VII. FIRE RESISTANCE RATED CONSTRUCTION

CONSTRUCTION - CONSTRUCTION IS INTENDED TO BE UNPROTECTED, NON-COMBUSTIBLE.

- A. SEPARATION FROM OTHER BUILDINGS (IBC TABLE 602): 0 HR  
(GREATER THAN 30 FT BETWEEN BASE BUILDING AND TOWER)
- B. EXPOSURE PROTECTION (IBC TABLE 602)
- C. STRUCTURAL FRAME, INCLUDING COLUMNS, GIRDERS AND TRUSSES (IBC TABLE 601).
- REQUIRED: NONE  
PROVIDED: NONE
- D. FLOORS, INCLUDING SUPPORTING BEAMS AND JOISTS (IBC TABLE 601)
- REQUIRED: NONE  
PROVIDED: NONE
- E. ROOF, INCLUDING SUPPORTING BEAMS AND JOISTS (IBC TABLE 601)
- REQUIRED: NONE  
PROVIDED: NONE

INTERIOR FIRE RESISTANCE RATED SEPARATIONS SHALL BE IN ACCORDANCE WITH THE IBC.

- A. TOWER TO BASE BUILDING (IBC SECTION 602)
- REQUIRED: 0 HOUR (DISTANCE BETWEEN BUILDINGS > 30 FT)  
PROVIDED: 0 HOUR
- B. STAIR AND SHAFT ENCLOSURES (IBC SECTION 707.4)
- REQUIRED: 1-HOUR FIRE RESISTANCE RATED SEPARATION  
PROVIDED: NONE – THERE ARE NO SHAFTS OR STAIRS
- C. MECHANICAL ROOM (NFPA 101 SECTION 38.3.2.1)
- REQUIRED: SMOKE PARTITION  
PROVIDED: SMOKE PARTITION
- D. RADAR EQUIPMENT TO CORRIDOR (NFPA 75, SECTION 5.1.3, FAA ORDER 6480.7D)
- REQUIRED: 1-HOUR FIRE RESISTANCE RATED SEPARATION  
PROVIDED: 1-HOUR FIRE RESISTANCE RATED SEPARATION
- E. UPS / BATTERY ROOM, ENGINE GENERATOR ROOM (FAA ORDER 6480.7D)
- REQUIRED: 1-HOUR FIRE RESISTANCE RATED SEPARATION  
PROVIDED: 1-HOUR FIRE RESISTANCE RATED SEPARATION
- H. OPENING PROTECTION IN 1-HOUR WALLS EXCLUDING SHAFT, EXIT ENCLOSURE AND EXIT PASSAGEWAY WALLS (IBC TABLE 714.2)
- REQUIRED: 45-MINUTE DOORS  
PROVIDED: 45-MINUTE DOORS
- J. CORRIDORS: CORRIDORS ARE NOT REQUIRED TO BE FIRE RESISTANCE RATED PER NFPA 101 SECTION 38.3.6.1 (3) IN NEW BUSINESS OCCUPANCIES PROTECTED THROUGHOUT BY A SUPERVISED AUTOMATIC SPRINKLER SYSTEM.
- K. STORAGE ROOMS ARE NOT REQUIRED TO BE SEPARATED BY SMOKE OR FIRE RESISTANCE RATED CONSTRUCTION IN ACCORDANCE WITH NFPA 101, SECTION A38.3.2.1 AS THESE SPACES STORE ROUTINE OFFICES SUPPLIES.

## VIII. INTERIOR FINISHES

INTERIOR FINISH WILL BE IN ACCORDANCE WITH THE REQUIREMENTS OF NFPA 101 CHAPTER 10 AND IBC CHAPTER 8.

- A. A MINIMUM OF CLASS A OR B INTERIOR WALL FINISH WILL BE PROVIDED IN EXITS AND EXIT ACCESS CORRIDORS (NFPA 101 SECTION 38.3.3.2.1).
- B. ALL OTHER AREAS, INTERIOR WALL AND CEILING FINISHES ARE REQUIRED TO BE A MINIMUM OF CLASS C (NFPA 101 SECTIONS 38.3.3.2.2).
- C. TYPICALLY, INTERIOR WALL FINISH WILL BE PAINT. INTERIOR FLOOR FINISH WILL BE A MINIMUM OF CLASS II FINISH (NFPA 101 SECTION 38.3.3.3.2).
- D. TYPICALLY, INTERIOR FLOOR FINISH WILL CONSIST OF CARPET, VINYL TILE, CERAMIC TILE AND SEALED CONCRETE AND COMPLY WITH THE REQUIREMENTS OF NFPA 101 SECTION 10.2.7.
- E. SPECIFIC WALL AND FLOOR FINISHES ARE SHOWN ON THE BUILDING'S INTERIOR FINISH SCHEDULE.

## IX. FIRE PROTECTION SYSTEM

- A. SUPPRESSION - THE FACILITY WILL BE PROTECTED THROUGHOUT BY AN ELECTRONICALLY SUPERVISED FULLY AUTOMATIC FIRE SPRINKLER SYSTEM
- B. FIRE PUMP - THE FACILITY WILL BE EQUIPPED WITH A FIRE PUMP AS REQUIRED TO SUPPLY THE AUTOMATIC FIRE SPRINKLER SYSTEM. THE FIRE PUMP SHOULD BE SIZED BASED ON SPRINKLER/STANDPIPE DEMAND FOR THE ADJACENT TOWER.
- C. ALARM & DETECTION - THE FACILITY WILL BE PROTECTED BY PARTIAL SMOKE DETECTION (ELECTRONIC EQUIPMENT ROOMS, TRACON CONTROL ROOMS, & EGRESS).
- D. ALARM NOTIFICATION AND COMMUNICATION - NOTIFICATION SHALL BE AS REQUIRED BY NFPA 72.

## X. MEANS OF EGRESS

MEANS OF EGRESS SHALL BE IN ACCORDANCE WITH NFPA 101.

- A. OCCUPANT LOAD (NFPA 101 SECTION 38.1.7)  
BUILDING TOTAL: 111 PEOPLE (11,537 SQUARE FEET, 100 SQUARE FEET PER PERSON)
- B. NUMBER OF EXITS (NFPA 101 SECTION 38.2.4.1)(2) ERRATA 101-03-1)  
REQUIRED: 2  
PROVIDED: 4
- A MINIMUM OF TWO EXITS ARE REQUIRED BY BOTH THE IBC AND THE LSC. EXITS MUST BE SEPARATED BY A MINIMUM OF 1/3 OF THE LENGTH OF THE MAXIMUM OVERALL DIAGONAL DIMENSION OF THE BUILDING OR AREA TO BE SERVED MEASURED IN A STRAIGHT LINE BETWEEN EXIT DOORS OR EXIT ACCESS DOORWAYS.
- C. CORRIDOR CAPACITY (NFPA 101 SECTION 38.2.3.1)  
REQUIRED: 44 INCHES  
PROVIDED: 60 INCHES
- D. EXIT DOORS  
MINIMUM WIDTH: 32 INCHES (PER DOOR)  
PROVIDED: 34 INCHES (CLEAR WIDTH)
- E. TRAVEL DISTANCE (NFPA 101 SECTION 38.2.6)  
PERMITTED: 300 FEET (MAXIMUM)  
PROVIDED: 80 FEET
- F. COMMON PATH (NFPA 101 SECTION 38.2.5.3.2)  
PERMITTED: 100 FEET (MAXIMUM)  
PROVIDED: 52 FEET
- G. DEAD-END CORRIDOR (NFPA 101 SECTION 38.2.5.2)  
PERMITTED: 50 FEET (MAXIMUM)  
PROVIDED: NONE
- H. EXIT SIGNS: EXIT SIGNS WILL BE INTERNALLY-ILLUMINATED, LED TYPE. EXIT SIGNS WILL HAVE INTEGRAL BATTERY BACKUP AND BE CONNECTED TO THE EMERGENCY CIRCUIT. SIGNS WILL BE LOCATED AT ALL BUILDING EXIT DOORS AND WHENEVER THE DIRECTION TO THE EXIT IS NOT READILY OBVIOUS.
- I. EMERGENCY LIGHTING: ALL MEANS OF EGRESS, INCLUDING EXIT ACCESS CORRIDORS AND EXIT DISCHARGE WILL BE PROVIDED WITH EMERGENCY LIGHTING. EMERGENCY LIGHTING WILL BE PROVIDED VIA STANDARD FIXTURES ON THE EMERGENCY POWER SYSTEM WITH INTEGRAL BATTERY PACK UNITS. EMERGENCY LIGHTING WILL BE PROVIDED FOR A MINIMUM OF 1 1/2 HOURS IN THE EVENT OF INTERNAL POWER FAILURE. BACKUP POWER IS PROVIDED BY BOTH THE ENGINE GENERATOR AND BATTERY BACKUP. AVERAGE ILLUMINATION WILL NOT BE LESS THAN 10 LUX (1-FOOT CANDLE) WITH A MINIMUM OF 1 LU (0.1-FOOT CANDLE) AT ANY POINT.

## XI. ACCESSIBILITY

ACCESSIBILITY SHALL BE AS PER THE ARCHITECTURAL BARRIERS PORTION OF THE AMERICANS WITH DISABILITIES ACT AND ARCHITECTURAL BARRIERS ACT ACCESSIBILITY GUIDELINE, AS PUBLISHED BY THE UNITED STATES ACCESS BOARD, DATED JULY 23, 2004.

THE MOST STRINGENT ACCESSIBILITY REQUIREMENTS WILL PREVAIL BETWEEN LOCAL CODES AND ABA. THE CRITERIA OF THESE STANDARDS SHOULD BE CONSIDERED A MINIMUM IN PROVIDING ACCESS TO THE PHYSICALLY DISABLED. WHERE DIMENSIONS FOR CLEARANCES ARE STATED, ALLOWANCE SHOULD BE MADE IN THE DESIGN FOR CONSTRUCTION TOLERANCES TO ENSURE THAT THE FINISHED CONSTRUCTION IS IN FULL COMPLIANCE.

## XII. REQUIRED SECURITY SETBACK

NEW FACILITY CONSTRUCTION SHALL COMPLY WITH BLAST PROTECTION REQUIREMENTS OF THE MOST CURRENT ISSUE OF FAA ORDER 1600.69, FAA FACILITY SECURITY MANAGEMENT PROGRAM. THE SITE DOES NOT PROVIDE THE MINIMUM SETBACK DISTANCES ON THE EAST SIDE AS REQUIRED BY THE MOST CURRENT ISSUE OF FAA ORDER 1600.69, AN EXCEPTION TO THE REQUIREMENT WILL BE REQUESTED FOR REDUCED SETBACK AT THE EAST PROPERTY LINE ABUTTING THE IDAHO AIR NATIONAL GUARD.

### XIII. MECHANICAL ROOM LEGEND NOTES

- ① 4 CHILLED WATER (CHW) PUMPS (2 FOR BASE BUILDING LOOP AND 2 FOR TOWER LOOP)
- ② CHW EXPANSION TANK AND CHEMICAL SHOT FEEDER (BASE BUILDING LOOP)
- ③ CHW EXPANSION TANK AND CHEMICAL SHOT FEEDER (TOWER LOOP)
- ④ CHW PLATE/FRAME HEAT EXCHANGER
- ⑤ WATER FILTRATION SYSTEM (IF REQUIRED)
- ⑥ DOMESTIC WATER BOOSTER PUMP SYSTEM (TOWER)
- ⑦ WATER HEATER
- ⑧ 4 HEATING HOT WATER (HHW) PUMPS (2 FOR BASE BUILDING LOOP AND 2 FOR TOWER LOOP)
- ⑨ HHW EXPANSION TANK AND CHEMICAL SHOT FEEDER (BASE BUILDING LOOP)
- ⑩ HHW EXPANSION TANK AND CHEMICAL SHOT FEEDER (TOWER LOOP)
- ⑪ HHW PLATE/FRAME HEAT EXCHANGER

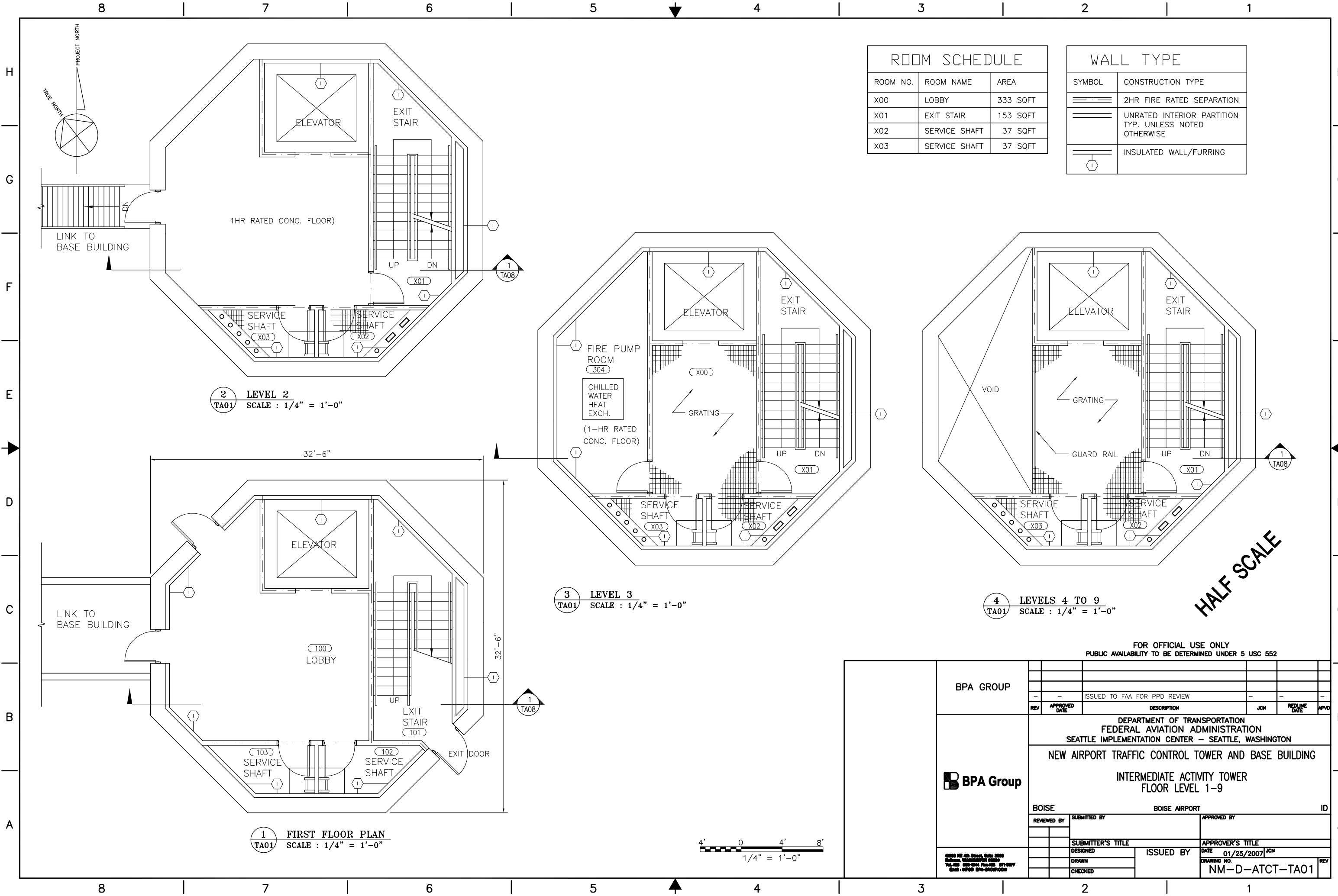
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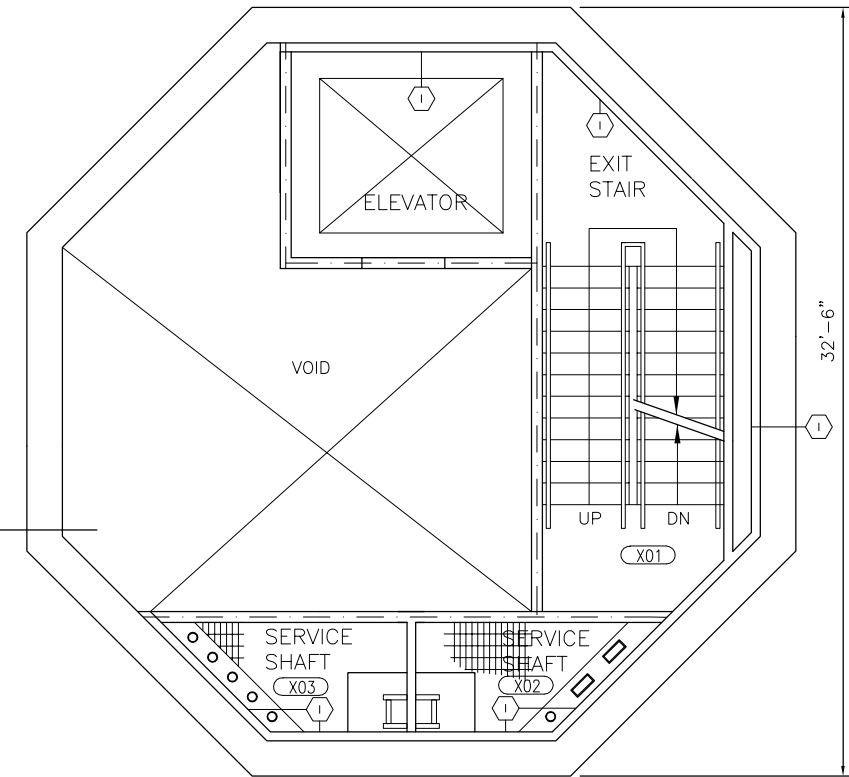




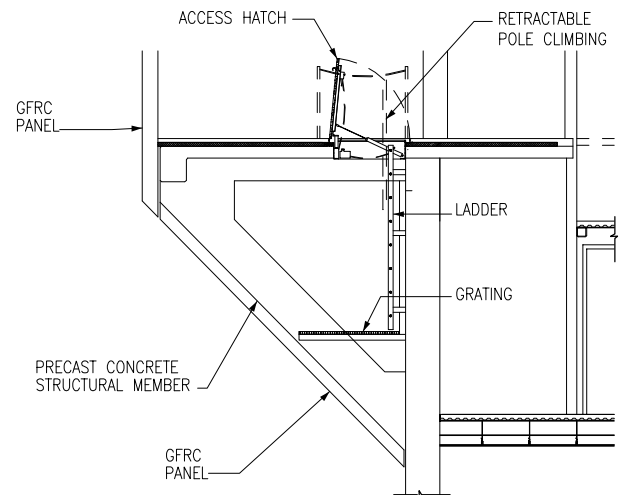




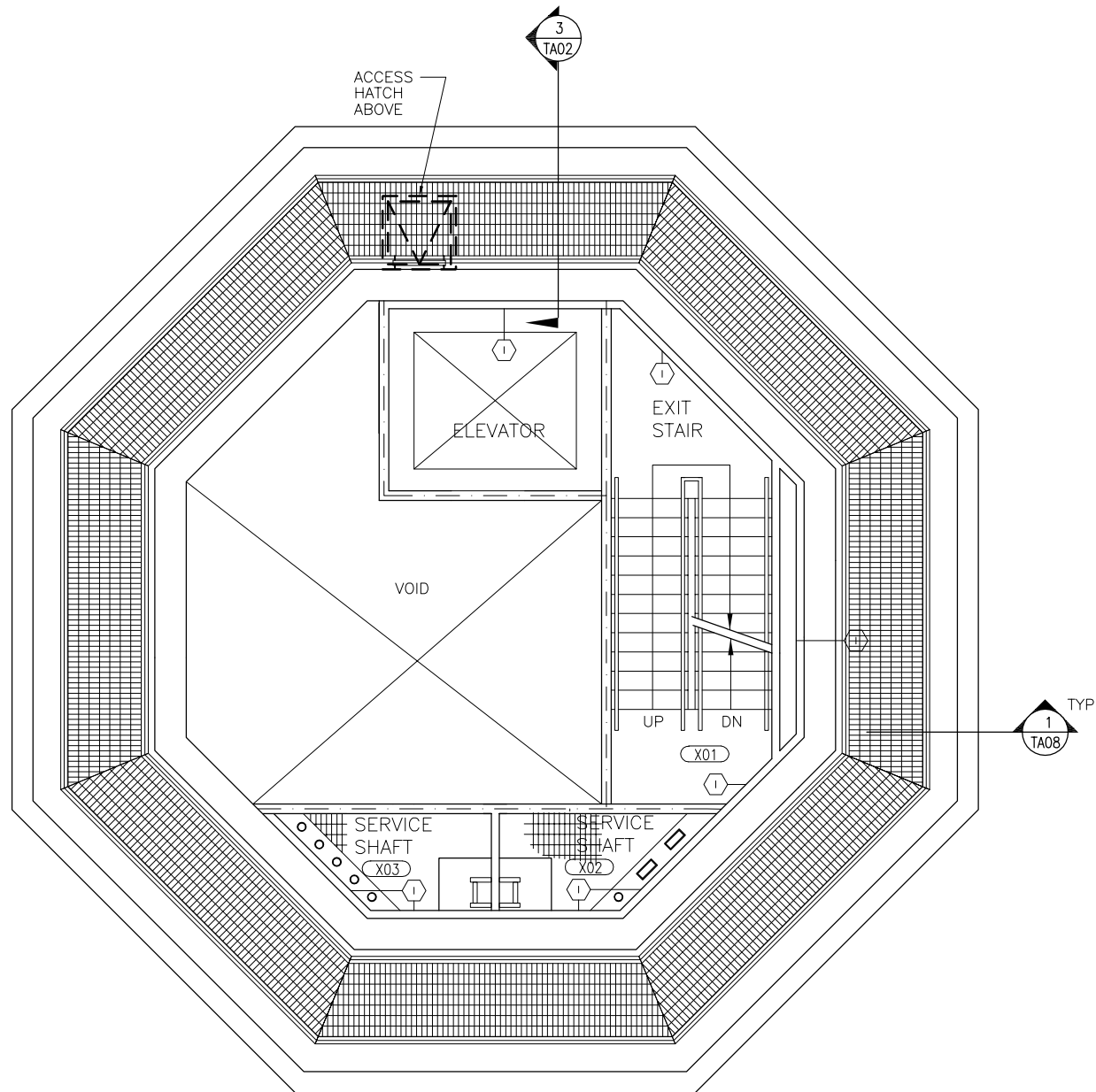




1 TYP. INTERMEDIATE STAIR LANDINGS  
SCALE : 1/4" = 1'-0"



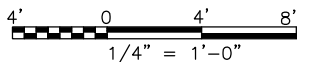
3 SECTION  
SCALE : 1/4" = 1'-0"



2 SUBJUNCTION LEVEL  
SCALE : 1/4" = 1'-0"

WALL TYPE	
SYMBOL	CONSTRUCTION TYPE
	2HR FIRE RATED SEPARATION
	UNRATED INTERIOR PARTITION TYP. UNLESS NOTED OTHERWISE
	INSULATED WALL/FURRING

HALF SCALE



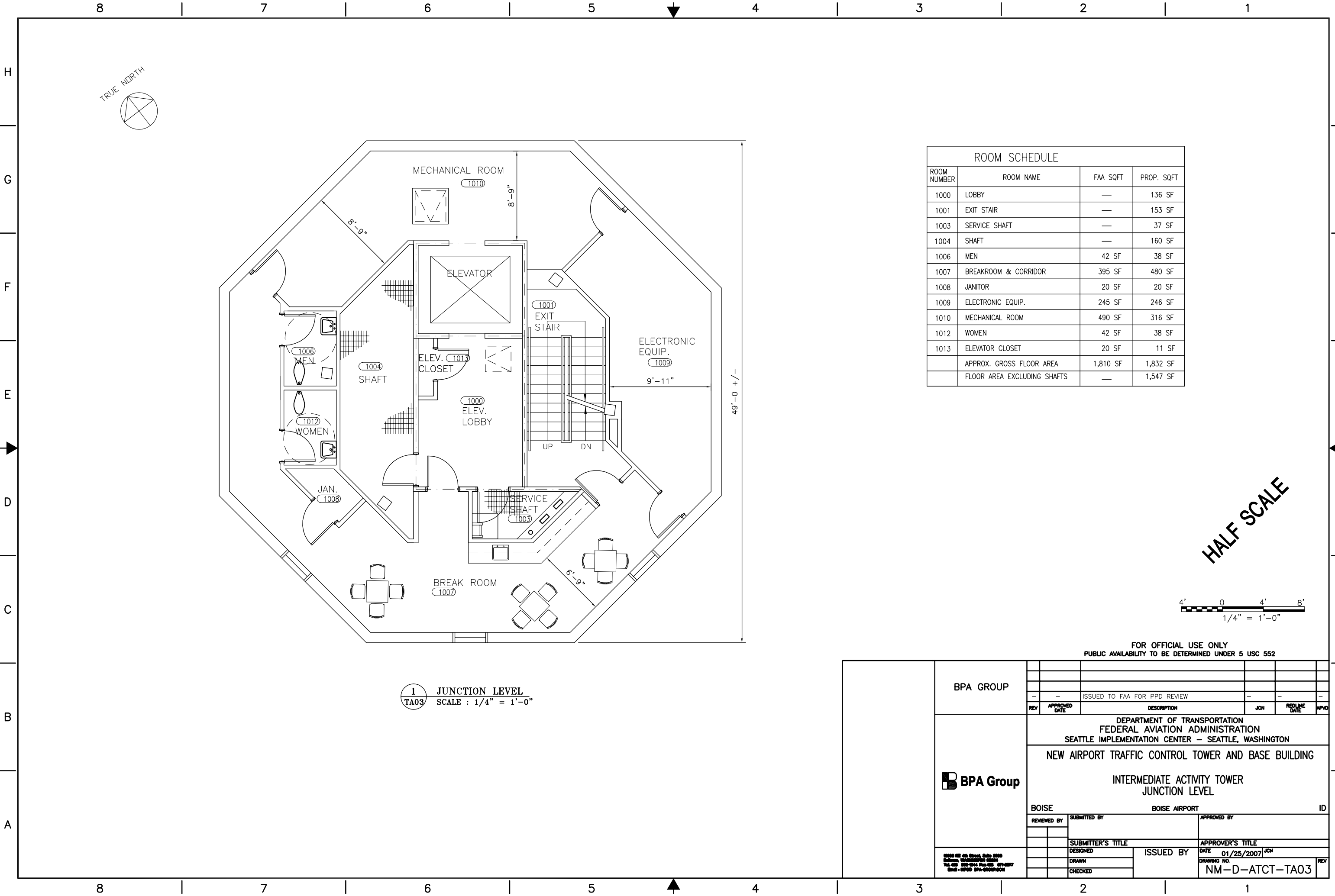
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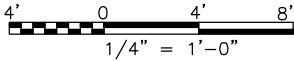
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DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION SEATTLE IMPLEMENTATION CENTER – SEATTLE, WASHINGTON									
NEW AIRPORT TRAFFIC CONTROL TOWER AND BASE BUILDING									
INTERMEDIATE ACTIVITY TOWER INTERMEDIATE & SUBJUNCTION LEVELS									
BOISE		BOISE AIRPORT				ID			
REVIEWED BY		SUBMITTED BY				APPROVED BY			
		SUBMITTER'S TITLE				APPROVER'S TITLE			
DESIGNED		ISSUED BY				DATE 01/25/2007 JCN			
DRAWN						DRAWING NO.			
CHECKED						NM-D-ATCT-TA02			
						REV			







ROOM SCHEDULE			
ROOM NUMBER	ROOM NAME	FAA SQFT	PROP. SQFT
1000	LOBBY	—	136 SF
1001	EXIT STAIR	—	153 SF
1003	SERVICE SHAFT	—	37 SF
1004	SHAFT	—	160 SF
1006	MEN	42 SF	38 SF
1007	BREAKROOM & CORRIDOR	395 SF	480 SF
1008	JANITOR	20 SF	20 SF
1009	ELECTRONIC EQUIP.	245 SF	246 SF
1010	MECHANICAL ROOM	490 SF	316 SF
1012	WOMEN	42 SF	38 SF
1013	ELEVATOR CLOSET	20 SF	11 SF
	APPROX. GROSS FLOOR AREA	1,810 SF	1,832 SF
	FLOOR AREA EXCLUDING SHAFTS	—	1,547 SF

HALF SCALE



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		REV	APPROVED DATE	ISSUED TO FAA FOR PPD REVIEW				JCH	REDLINE DATE	APVD					
	 BPA Group	DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION SEATTLE IMPLEMENTATION CENTER — SEATTLE, WASHINGTON													
		NEW AIRPORT TRAFFIC CONTROL TOWER AND BASE BUILDING													
		INTERMEDIATE ACTIVITY TOWER JUNCTION LEVEL													
		BOISE					BOISE AIRPORT			ID					
		REVIEWED BY		SUBMITTED BY				APPROVED BY							
				SUBMITTER'S TITLE				APPROVER'S TITLE							
 BPA Group 2020 NE 4th Street, Suite 2000 Seattle, WA 98102 Tel: 206-465-4444 Fax: 206-465-4444 Email: bpa@bpa-group.com				DESIGNED		ISSUED BY		DATE		JCH					
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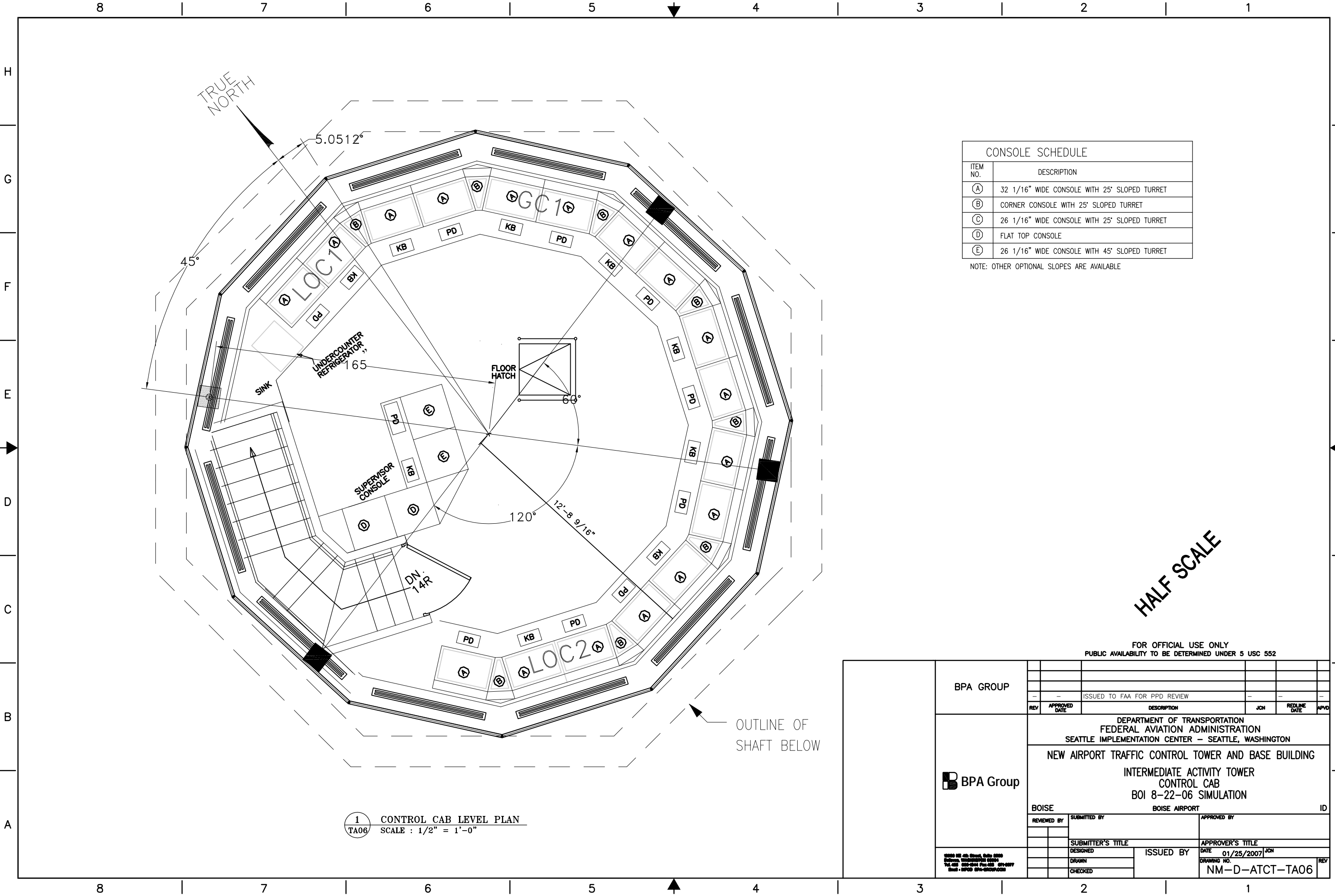












CONSOLE SCHEDULE	
ITEM NO.	DESCRIPTION
(A)	32 1/16" WIDE CONSOLE WITH 25° SLOPED TURRET
(B)	CORNER CONSOLE WITH 25° SLOPED TURRET
(C)	26 1/16" WIDE CONSOLE WITH 25° SLOPED TURRET
(D)	FLAT TOP CONSOLE
(E)	26 1/16" WIDE CONSOLE WITH 45° SLOPED TURRET

NOTE: OTHER OPTIONAL SLOPES ARE AVAILABLE

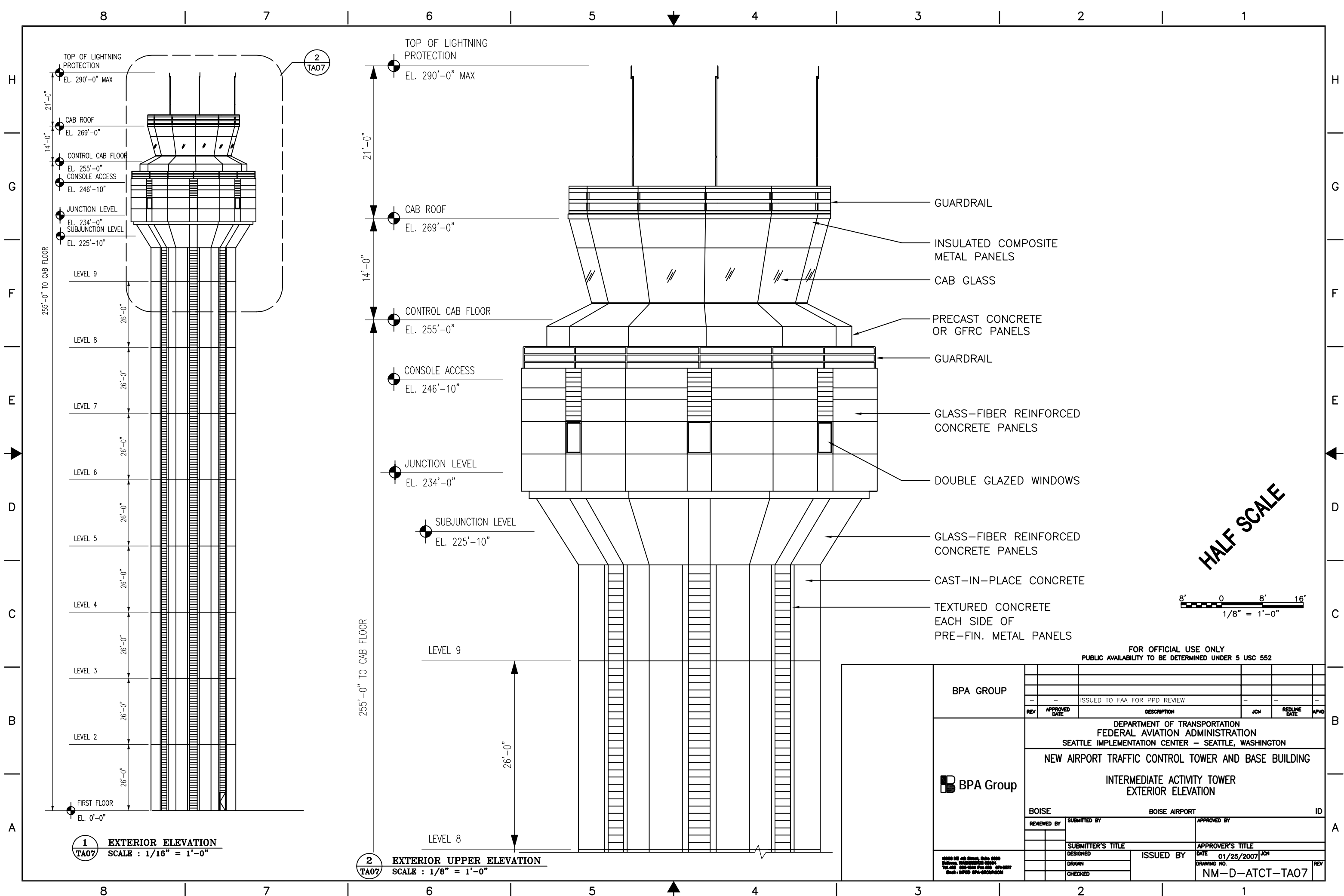
HALF SCALE

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BPA Group	DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION SEATTLE IMPLEMENTATION CENTER – SEATTLE, WASHINGTON											
	NEW AIRPORT TRAFFIC CONTROL TOWER AND BASE BUILDING INTERMEDIATE ACTIVITY TOWER CONTROL CAB BOI 8-22-06 SIMULATION											
	BOISE				BOISE AIRPORT		ID					
	REVIEWED BY		SUBMITTED BY		APPROVED BY							
				SUBMITTER'S TITLE		APPROVER'S TITLE						
		DESIGNED		ISSUED BY		DATE 01/25/2007 JCN						
		DRAWN				DRAWING NO. NM-D-ATCT-TA06						
		CHECKED				REV						

1 CONTROL CAB LEVEL PLAN  
TA06 SCALE : 1/2" = 1'-0"











## BASIS OF DESIGN

## I. FACILITY DEFINITION

THIS TOWER IS INTENDED FOR INTERMEDIATE ACTIVITY LEVEL TOWER APPLICATIONS AND HAS ONE STAIRWELL AND AN ELEVATOR. THE SHAFT IS NON-OCCUPIED AND PROVIDES ACCESS TO THE INTERMEDIATE AND JUNCTION LEVELS. DUE TO THE HEIGHT OF THE CAB FLOOR, A BREAK ROOM IS PROVIDED AT THE JUNCTION LEVEL.

## II. CODES OF RECORD

THE DESIGN AND CONSTRUCTION OF THE AIRPORT TRAFFIC CONTROL TOWER (ATCT) SHALL COMPLY WITH THE REQUIREMENTS OF THE INTERNATIONAL BUILDING CODE (IBC), 2003 EDITION AND NFPA 101, THE LIFE SAFETY CODE (LSC), 2003 EDITION. WHERE THE (IBC) AND NFPA 101 HAVE CONFLICTING REQUIREMENTS, THE MORE RESTRICTIVE CODE SHALL TAKE PRECEDENCE. (NOTE: THE LSC, 2000 EDITION IS USED AS THE APPROVED ALTERNATIVE TO COMPLY WITH THE OSHA EXIT ROUTE PROVISIONS, AS PERMITTED BY 29 CFR 1910.35).

THE FOLLOWING DOCUMENTS WILL PROVIDE THE CRITERIA WHICH WILL GOVERN THE FIRE PROTECTION AND LIFE SAFETY DESIGN OF THE FACILITY.

- A. INTERNATIONAL BUILDING CODE (IBC), 2003 EDITION.
- B. INTERNATIONAL FIRE CODE (IFC), 2003 EDITION.
- C. NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 10 (NFPA 10), STANDARD FOR PORTABLE FIRE EXTINGUISHERS, 2002 EDITION.
- D. NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 13 (NFPA 13), STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS, 2002 EDITION.
- E. NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 14 (NFPA 14), STANDARD FOR THE INSTALLATION OF STANDPIPE AND HOSE SYSTEMS, 2003 EDITION.
- F. NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 20 (NFPA 20), STANDARD FOR THE INSTALLATION OF STATIONARY PUMPS FOR FIRE PROTECTION, 2003 EDITION.
- G. NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 24 (NFPA 24), STANDARD FOR THE INSTALLATION OF PRIVATE FIRE SERVICE MAINS AND THEIR APPURTENANCES, 2002 EDITION.
- H. NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 70 (NFPA 70), NATIONAL ELECTRICAL CODE, 2002 EDITION.
- I. NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 72 (NFPA 72), NATIONAL FIRE ALARM CODE, 2002 EDITION.
- J. NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 75 (NFPA 75), STANDARD FOR THE PROTECTION OF INFORMATION TECHNOLOGY EQUIPMENT, 2003 EDITION.
- K. NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 90A (NFPA 90A), STANDARD FOR THE INSTALLATION OF AIR-CONDITIONING AND VENTILATING SYSTEMS, 2002 EDITION.
- L. NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 92A (NFPA 92A), RECOMMENDED PRACTICE FOR SMOKE CONTROL SYSTEMS, 2000 EDITION.
- M. NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 101 (NFPA 101), THE LIFE SAFETY CODE, 2003 EDITION.

### III. USE & OCCUPANCY CLASSIFICATION

- A. BUSINESS (IBC SECTION 304)
- B. NEW BUSINESS (NFPA 101, SECTION 38.1.1.1)

#### IV. SPECIAL DETAILED REQUIREMENTS BASED ON USE AND OCCUPANCY

INTERNATIONAL BUILDING CODE (IBC SECTIONS 403 & 412) - THIS ATCT IS NOT A HIGH-RISE BUILDING IN ACCORDANCE WITH THE REQUIREMENTS OF THE IBC. THE TOWER IS DESIGNED TO SERVE AN OCCUPANT LOAD OF LESS THAN 15 PERSONS ON A FLOOR LEVEL AND HAS A MAX. GROSS FLOOR AREA OF 1,500 SQUARE FEET ON A FLOOR LEVEL.

LIFE SAFETY CODE (NFPA 101 SECTIONS 11.3 AND 11.8) – THIS ATCT IS CLASSIFIED AS A HIGH-RISE BUILDING AND A TOWER IN ACCORDANCE WITH THE REQUIREMENTS OF THE LSC. THE TOWER IS DESIGNED TO ACCOMMODATE AN OCCUPANT LOAD OF LESS THAN 25 PERSONS IN THE TOWER BUILDING. THE TOWER IS DESIGNED TO BE GREATER THAN 75 FEET IN HEIGHT, AS MEASURED FROM THE LOWEST LEVEL OF FIRE DEPARTMENT ACCESS TO THE FLOOR LEVEL OF THE UPPER OCCUPIED FLOOR.

## V. GENERAL BUILDING HEIGHT AND AREA

- A. ALLOWABLE HEIGHT (IBC SECTION 412)  
MAXIMUM PERMITTED: UNLIMITED (TYPE IA CONSTRUCTION)  
PROVIDED: 255 FEET
- B. ALLOWABLE GROSS FLOOR AREA (IBC SECTION 412)  
MAXIMUM PERMITTED: 1,500 SF MAX. ON ANY ONE FLOOR  
MAXIMUM PROVIDED: 1,500 SF ON JUNCTION LEVEL

## VI. TYPE OF CONSTRUCTION

- A. CONSTRUCTION TYPE (IBC SECTION 412)

MINIMUM REQUIRED: IA  
PROVIDED: IA

## VII. FIRE RESISTANCE RATED CONSTRUCTION

CONSTRUCTION IS INTENDED TO BE PROTECTED, NON-COMBUSTIBLE.

- A. SEPARATION FROM OTHER BUILDINGS (IBC TABLE 602)
- B. EXPOSURE PROTECTION (IBC TABLE 602)
- C. STRUCTURAL FRAME, INCLUDING COLUMNS, GIRDERS AND TRUSSES (IBC TABLE 601). (CAB MULLIONS ARE NOT REQUIRED TO BE FIREPROOFED.)
- REQUIRED: 3-HOUR  
PROVIDED: 3-HOUR
- D. FLOORS, INCLUDING SUPPORTING BEAMS AND JOISTS (IBC TABLE 601) (THE CONSOLE ACCESS RING IS CONSIDERED PART OF THE CAB AND THEREFORE NOT REQUIRED TO BE SEPARATED FROM THE CAB BY FIRE-RATED CONSTRUCTION.)
- REQUIRED: 2-HOUR  
PROVIDED: 2-HOUR
- E. ROOF, INCLUDING SUPPORTING BEAMS AND JOISTS (IBC TABLE 601)

REQUIRED: 1.5-HOUR  
PROVIDED: 1.5-HOUR

INTERIOR FIRE RESISTANCE RATED SEPARATIONS SHALL BE IN ACCORDANCE WITH THE IBC.

- A. TOWER TO BASE BUILDING (IBC SECTION 602)  
THE TOWER IS SEPARATED FROM THE BASE BUILDING BY A LINK PROVIDING A SEPARATION BETWEEN THE BUILDINGS IN EXCESS OF 30 FEET, THEREFORE THE EXTERIOR WALLS DO NOT REQUIRE A FIRE RESISTANCE RATING FOR REASONS OF BUILDING PROXIMITY
- B. TOWER STAIR AND SHAFT ENCLOSURES (IBC SECTION 707.4)  
REQUIRED: 2-HOUR  
PROVIDED: 2-HOUR
- C. MECHANICAL ROOM (NFPA 101 SECTION 38.3.2)  
REQUIRED: NONE  
PROVIDED: NONE
- D. OPENING PROTECTION IN 1-HOUR WALLS EXCLUDING SHAFT, EXIT ENCLOSURE AND EXIT PASSAGEWAY WALLS (IBC TABLE 714.2)  
REQUIRED: 45-MINUTE DOORS  
PROVIDED: 45-MINUTE DOORS
- E. OPENING PROTECTION IN 1-HOUR WALLS FOR SHAFT, EXIT ENCLOSURE AND EXIT PASSAGEWAY WALLS (IBC TABLE 714.2)  
REQUIRED: 1-HOUR DOORS  
PROVIDED: 1-HOUR DOORS
- F. OPENING PROTECTION IN 2-HOUR WALLS (IBC TABLE 714.2)  
REQUIRED: 1 1/2-HOUR DOORS  
PROVIDED: 1 1/2-HOUR DOORS
- G. OPENING PROTECTION IN 3-HOUR WALLS (IBC TABLE 714.2)  
REQUIRED: 3-HOUR DOORS  
PROVIDED: 3-HOUR DOORS
- H. CORRIDORS: CORRIDORS ARE NOT REQUIRED TO BE FIRE RESISTANCE RATED PER NFPA 101 SECTION 38.3.6.1 (3) IN NEW BUSINESS OCCUPANCIES PROTECTED THROUGHOUT BY A SUPERVISED AUTOMATIC SPRINKLER SYSTEM.
- I. SMOKEPROOF ENCLOSURES: SMOKEPROOF ENCLOSURES ARE NOT REQUIRED BECAUSE THE STAIRWAYS ARE TO BE PRESSURIZED (IBC 412.1.3)

## VIII. INTERIOR FINISHES

INTERIOR FINISH WILL BE IN ACCORDANCE WITH THE REQUIREMENTS OF NFPA 101  
CHAPTER 10 AND IBC CHAPTER 8.

- A. A MINIMUM OF CLASS A OR B INTERIOR WALL FINISH WILL BE PROVIDED IN EXITS AND EXIT ACCESS CORRIDORS (NFPA 101 SECTION 38.3.3.2.1).
- B. ALL OTHER AREAS, INTERIOR WALL AND CEILING FINISHES ARE REQUIRED TO BE A MINIMUM OF CLASS C (NFPA 101 SECTIONS 38.3.3.2.2).
- C. INTERIOR WALL FINISH WILL BE PAINT. INTERIOR FLOOR FINISH WILL BE A MINIMUM OF CLASS II FINISH (NFPA 101 SECTION 38.3.3.3.2).
- D. INTERIOR FLOOR FINISH WILL CONSIST OF CARPET, VINYL TILE, CERAMIC TILE OF (NFPA 101 SECTION 10.2.7).
- E. SPECIFIC WALL AND FLOOR FINISHES ARE SHOWN ON THE APPROPRIATE BUILDING'S INTERIOR FINISH SCHEDULE.

## IX. FIRE PROTECTION SYSTEM

- A. SUPPRESSION – THE FACILITY WILL BE PROTECTED THROUGHOUT BY AN ELECTRICALLY SUPERVISED FULLY AUTOMATIC FIRE SPRINKLER SYSTEM (ELEVATOR PROTECTION SHALL BE PROVIDED AS REQUIRED BY NFPA 72 AND ASME A.17.1).
- B. FIRE PUMP – THE FACILITY WILL BE EQUIPPED WITH A FIRE PUMP AS REQUIRED TO SUPPLY THE AUTOMATIC FIRE SPRINKLER AND COMBINATION STANDPIPE SYSTEM. WHERE THE FIRE DEPARTMENT CAN ADEQUATELY PUMP THE STANDPIPE TO THE REQUIRED PRESSURE, THE FIRE PUMP SHOULD BE SIZED FOR SPRINKLER DEMAND (WITH SUPPLEMENTAL HOSE STREAM) ONLY.
- C. ALARM AND DETECTION – THE FACILITY WILL BE PROTECTED THROUGHOUT BY SMOKE DETECTION (ELEVATOR PROTECTION SHALL BE PROVIDED AS REQUIRED BY NFPA 72 AND ASME A 17.1).
- D. ALARM NOTIFICATION AND COMMUNICATION – NOTIFICATION SHALL BE AS REQUIRED BY NFPA 72. HOWEVER, VOICE ALARM FEATURES ARE NOT PROVIDED, EVEN THOUGH THE BUILDING IS CLASSIFIED AS A HIGH-RISE STRUCTURE. THE FIREFIGHTER'S PHONE SYSTEM MAY ALSO BE ELIMINATED IF ACCEPTABLE TO THE LOCAL FIRE DEPARTMENT.

## X. MEANS OF EGRESS

MEANS OF EGRESS SHALL BE IN ACCORDANCE WITH NFPA 101 AND THE IBC.

A. OCCUPANT LOAD (NFPA 101 SECTION 38.1.7 AND IBC SECTION 1004)

TOWER TOTAL: (TO BE CONFIRMED BY FAA, CALCULATED TO BE 18)

THE OCCUPANT LOADS HAVE BEEN CALCULATED BASED UPON THE FOLLOWING CRITERIA:

- A. CONTROL CAB OCCUPANT LOAD FACTOR = 40 SF/PERSON (GROSS) = 13  
B. EQUIPMENT SPACE OCCUPANT LOAD FACTOR = 300 SF/PERSON (GROSS)  
C. ALL EQUIPMENT SPACES ON A GIVEN FLOOR WERE ASSUMED TO BE OCCUPIED FOR  
THE PURPOSE OF CALCULATING THE FLOOR OCCUPANT LOAD. = 1  
D. THE LARGEST EQUIPMENT SPACE ONLY WAS ASSUMED TO BE OCCUPIED FOR THE  
PURPOSE OF CALCULATING BUILDING OCCUPANT LOAD. = 1  
E. BREAK ROOM OCCUPANT LOADS WERE ASSUMED TO BE 100 SF/PERSON (NET) FOR  
PURPOSE OF CALCULATING FLOOR OCCUPANT LOADS. = 3


- B. NUMBER OF EXITS (NFPA 101 SECTION 7.2.13.1, 11.3.2.4 AND IBC SECTION 412.1.3)

REQUIRED: 1  
PROVIDED: 1

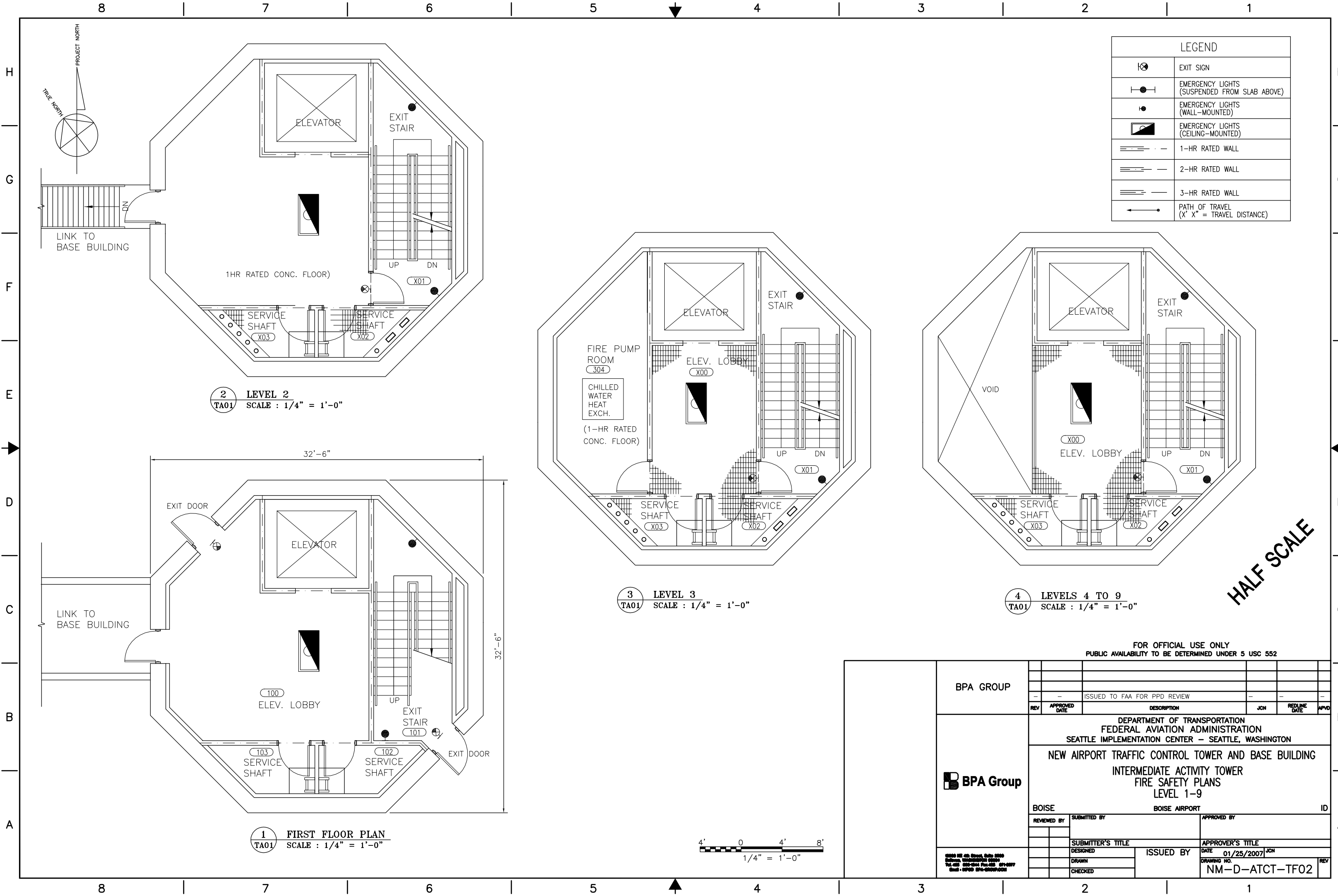
ONE EXIT IS REQUIRED BY BOTH THE IBC AND THE LSC. THE EXIT MUST DISCHARGE DIRECTLY TO THE OUTSIDE. THE ELEVATOR WILL BE DESIGNED AS A MEANS OF EGRESS TO MEET NFPA 101 SECTION 7.2.13.1

- C. CAPACITY (NFPA 101 SECTION 7.2.2.2.1 AND IBC SECTION 1009.1)  
REQUIRED: 36 INCHES  
PROVIDED: 44 INCHES
- D. TRAVEL DISTANCE (NFPA 101 SECTION 38.2.6 AND SECTION 1015.1)  
PERMITTED: 300 FEET (MAXIMUM)  
PROVIDED: 66 FEET (FROM CAB)
- E. COMMON PATH (NFPA 101 SECTION 38.2.5.3.2 AND AND IBC SECTION 1013.3)  
PERMITTED: 100 FEET MAXIMUM  
PROVIDED: 66 FEET (FROM CAB)
- F. DEAD-END CORRIDOR (NFPA 101 SECTION 38.2.5.2 AND IBC SECTION 1016.3)  
PERMITTED: 50 FEET (MAXIMUM)  
PROVIDED: 0 FEET
- G. EXIT SIGNS: EXIT SIGNS WILL BE INTERNALLY-ILLUMINATED, LED TYPE. EXIT SIGNS WILL HAVE INTEGRAL BATTERY BACKUP AND BE CONNECTED TO THE EMERGENCY CIRCUIT. SIGNS WILL BE LOCATED AT ALL BUILDING EXIT DOORS AND WHENEVER THE DIRECTION TO THE EXIT IS NOT READILY OBVIOUS
- H. EMERGENCY LIGHTING: ALL MEANS OF EGRESS, INCLUDING EXIT ACCESS CORRIDORS AND EXIT DISCHARGE WILL BE PROVIDED WITH EMERGENCY LIGHTING. EMERGENCY LIGHTING WITH INTEGRAL BATTERY PACK UNITS WILL BE PROVIDED VIA STANDARD FIXTURES ON THE EMERGENCY POWER SYSTEM. EMERGENCY LIGHTING WILL BE PROVIDED FOR A MINIMUM OF 1 1/2 HOURS THE EVENT OF INTERNAL POWER FAILURE. BACKUP POWER IS PROVIDED BY BOTH THE ENGINE GENERATOR AND BATTERY BACKUP. AVERAGE ILLUMINATION WILL NOT BE LESS THAN 10 LUX (1-FOOT CANDLE) WITH A MINIMUM OF 1 (0.1-FOOT CANDLE) AT ANY POINT.

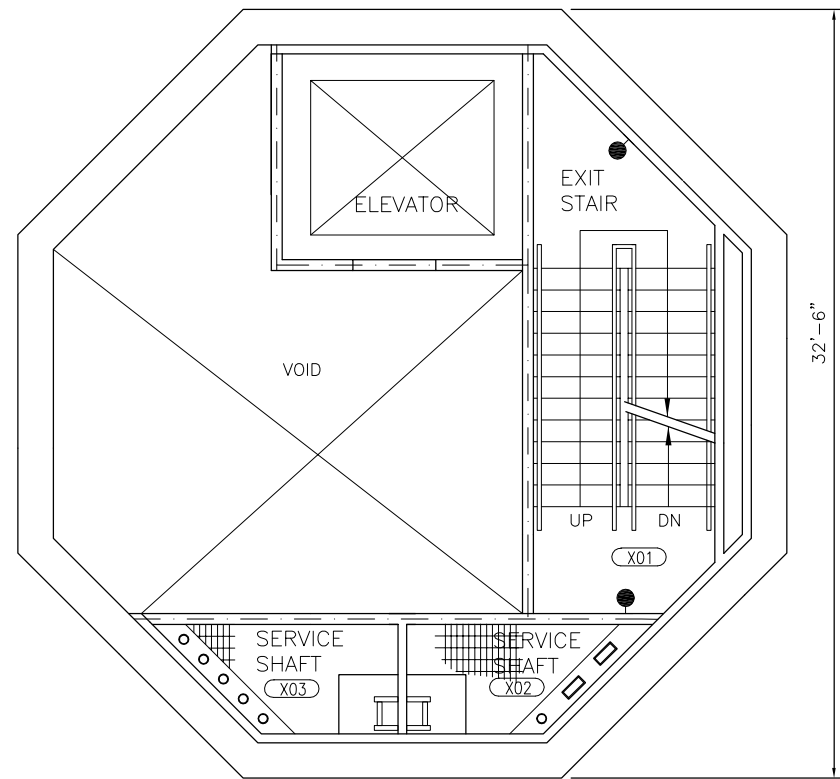
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<div> <b>BPA Group</b></div> <div>6500 NE 4th Street, Suite 5500 Bellevue, WA 98004-3231 206-462-7442 Tel: 462-650-4344 Fax: 462-670-6597 Email: BPGP@BPA-6500P-2066</div>	BPA GROUP										
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	NEW AIRPORT TRAFFIC CONTROL TOWER AND BASE BUILDING  INTERMEDIATE ACTIVITY TOWER BASIS OF DESIGN										
	BOISE			BOISE AIRPORT					ID		
	REVIEWED BY		SUBMITTED BY					APPROVED BY			
	SUBMITTER'S TITLE		SUBMITTER'S TITLE					APPROVER'S TITLE			
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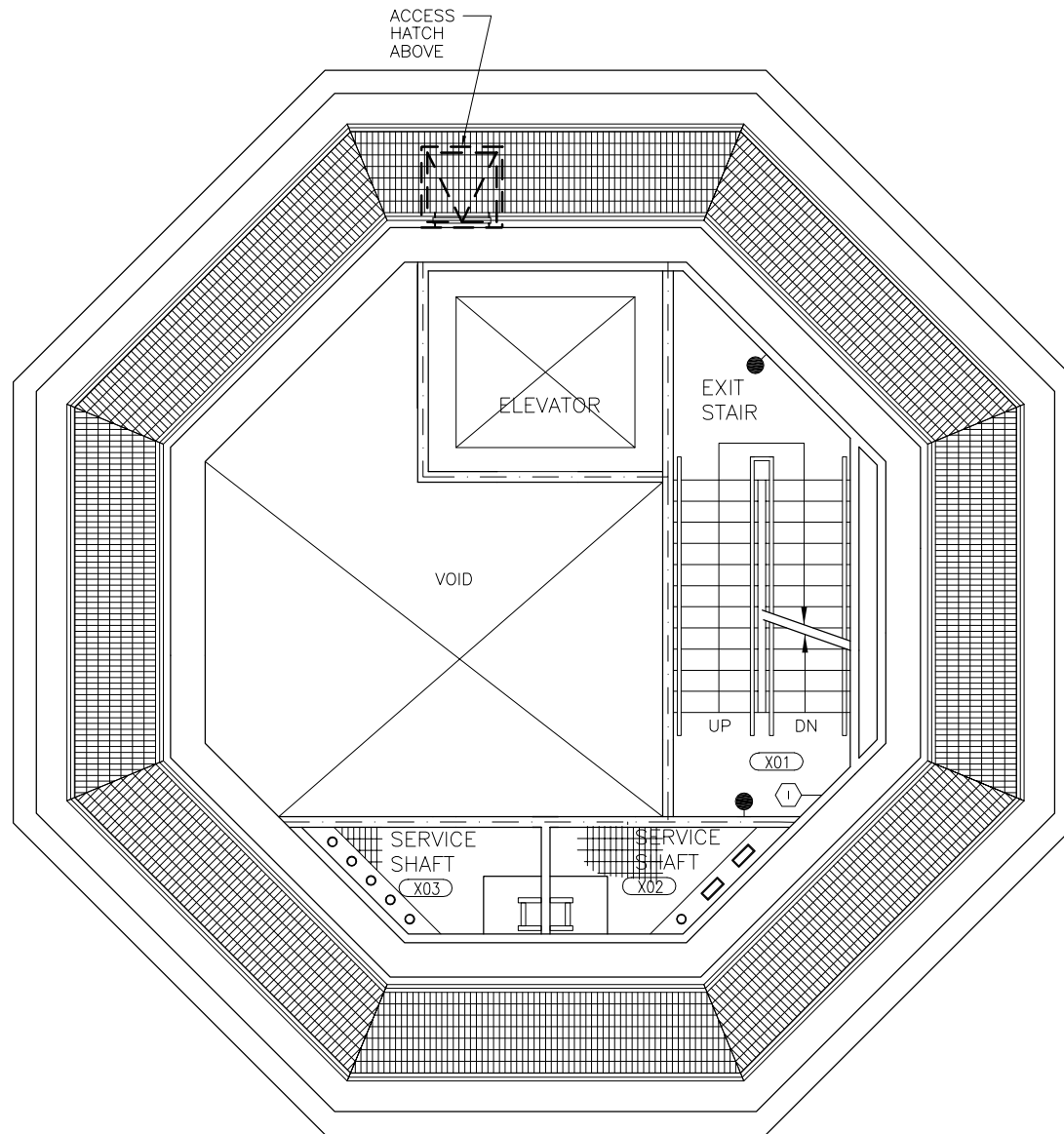








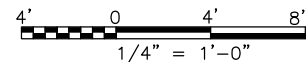
1 TYP. INTERMEDIATE STAIR LANDINGS  
TA02 SCALE : 1/4" = 1'-0"



2 SUBJUNCTION LEVEL  
TA02 SCALE : 1/4" = 1'-0"

LEGEND	
	EXIT SIGN
	EMERGENCY LIGHTS (SUSPENDED FROM SLAB ABOVE)
	EMERGENCY LIGHTS (WALL-MOUNTED)
	EMERGENCY LIGHTS (CEILING-MOUNTED)
	1-HR RATED WALL
	2-HR RATED WALL
	3-HR RATED WALL
	PATH OF TRAVEL (X' X" = TRAVEL DISTANCE)

HALF SCALE



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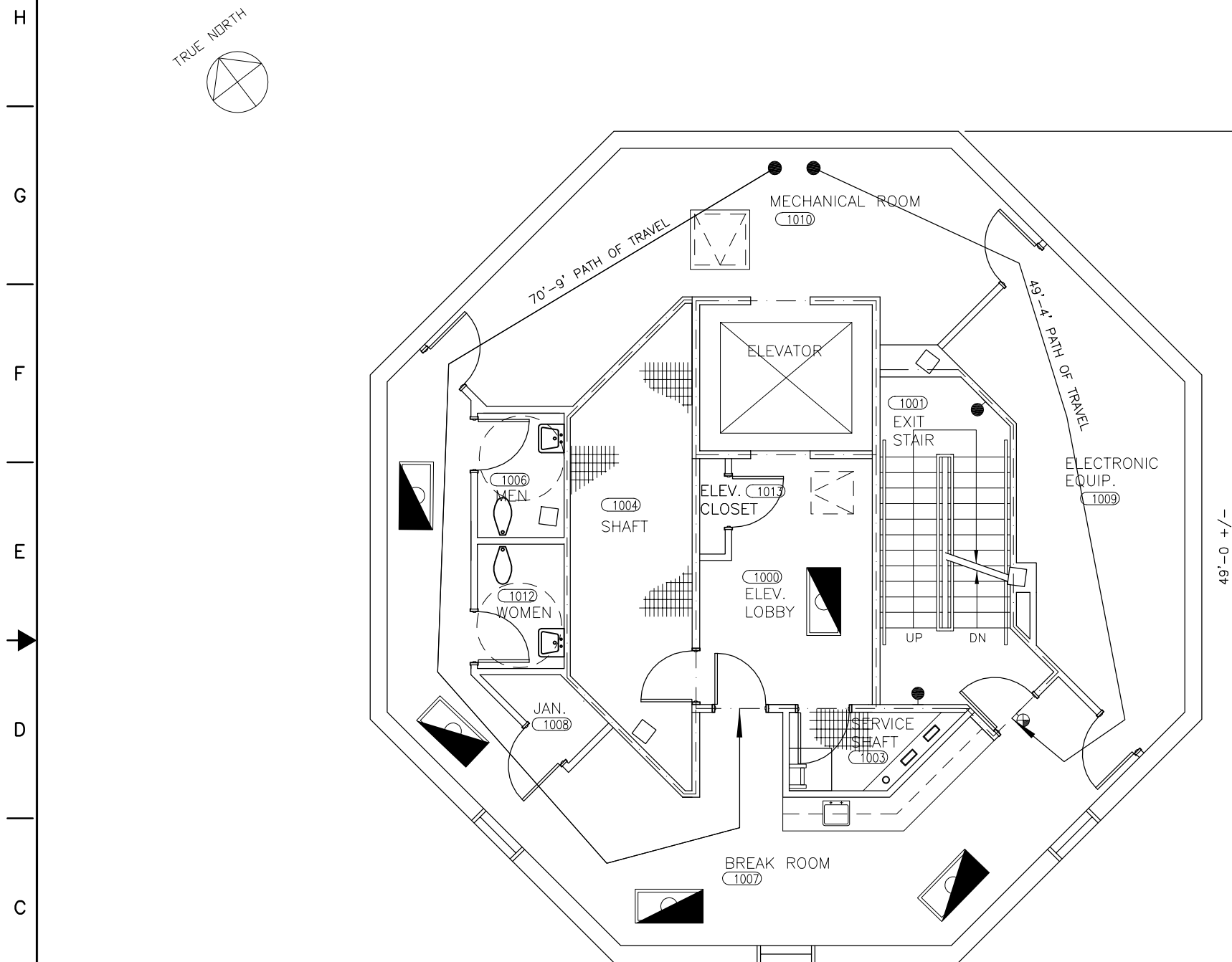
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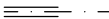

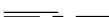



DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
SEATTLE IMPLEMENTATION CENTER – SEATTLE, WASHINGTON  
NEW AIRPORT TRAFFIC CONTROL TOWER AND BASE BUILDING  
INTERMEDIATE ACTIVITY TOWER  
INTERMEDIATE & SUBJUNCTION LEVELS

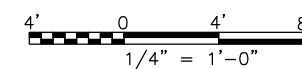
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LEGEND	
	EXIT SIGN
	EMERGENCY LIGHTS (SUSPENDED FROM SLAB ABOVE)
	EMERGENCY LIGHTS (WALL-MOUNTED)
	EMERGENCY LIGHTS (CEILING-MOUNTED)
	1-HR RATED WALL
	2-HR RATED WALL
	3-HR RATED WALL
	PATH OF TRAVEL ( $X' \times X''$ = TRAVEL DISTANCE)

HALF SCALE



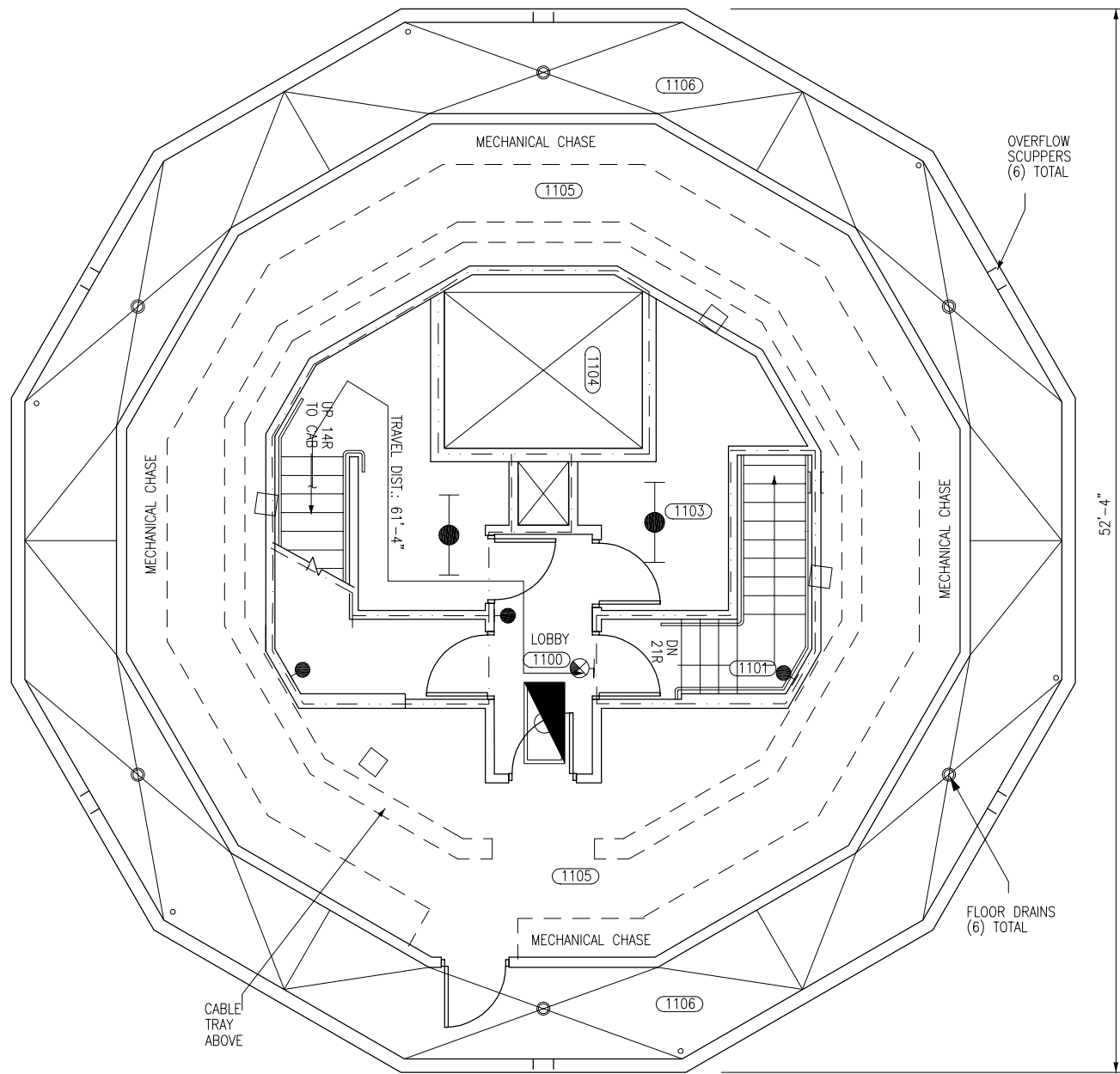
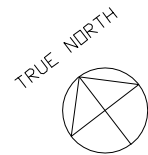
1 JUNCTION LEVEL  
TA03 SCALE : 1/4" = 1'-0"

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		—	—	ISSUED TO FAA FOR PPD REVIEW	—	—	—	—	—	
		REV	APPROVED DATE	DESCRIPTION	JCN	REDLINE DATE	APV	REV	REV	
	 <b>BPA Group</b>  <small>                     9500 NE 4th Street, Suite 2000                      Bellevue, WA 98004-3201 (206) 452-4200                      Tel: 425 452-4200 Fax: 425 452-4207                      Email: bpa@bpa.com                 </small>	DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION SEATTLE IMPLEMENTATION CENTER — SEATTLE, WASHINGTON								
NEW AIRPORT TRAFFIC CONTROL TOWER AND BASE BUILDING  INTERMEDIATE ACTIVITY TOWER FIRE SAFETY JUNCTION LEVEL										
BOISE  BOISE AIRPORT										
REVIEWED BY		SUBMITTED BY				APPROVED BY				
DESIGNED		ISSUED BY				DATE				
SUBMITTER'S TITLE					APPROVER'S TITLE					
DRAWN					DRAWING NO.					
CHECKED					NM-D-ATCT-TF04					

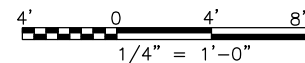
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TA04

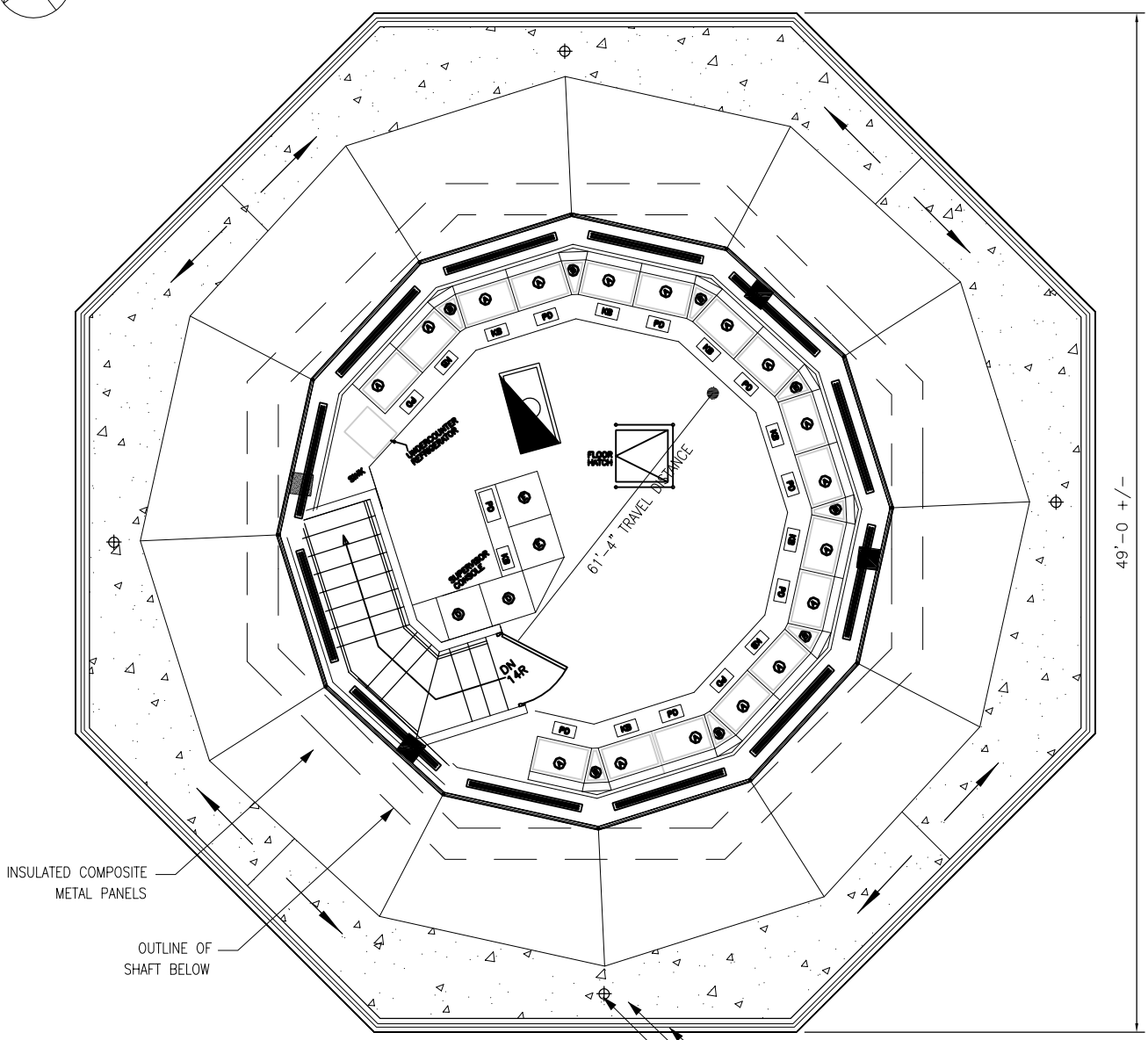
CONSOLE ACCESS LEVEL  
SCALE : 1/4" = 1'-0"



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<div>BPA GROUP</div> <div> <b>BPA Group</b></div> <div><small>2020 NE 4th Street, Suite 2000 Seattle, WA 98102-3100 TEL: 206-462-0000 FAX: 206-462-0007 Email: bpa@bpa-group.com</small></div>	<div>REV</div> <div>APPROVED DATE</div>	<div>ISSUED TO FAA FOR PPD REVIEW</div>	<div>DESCRIPTION</div>	<div>JCH</div>	<div>REDLINE DATE</div>	<div>APVD</div>
	DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION SEATTLE IMPLEMENTATION CENTER – SEATTLE, WASHINGTON					
	NEW AIRPORT TRAFFIC CONTROL TOWER AND BASE BUILDING INTERMEDIATE ACTIVITY TOWER FIRE SAFETY PLAN CONSOLE ACCESS LEVEL					
	BOISE		BOISE AIRPORT		ID	
	REVIEWED BY		SUBMITTED BY		APPROVED BY	
			SUBMITTER'S TITLE		APPROVER'S TITLE	
			DESIGNED		ISSUED BY	
			DRAWN		DATE 01/25/2007 JCH	
			CHECKED		DRAWING NO. NM-D-ATCT-TF05	





INSULATED COMPOSITE  
METAL PANELS

OUTLINE OF  
SHAFT BELOW

GUARDRAIL  
WALKWAY  
DRAINAGE

**1** FLOOR PLAN - 525 SF CAB  
TA05 SCALE : 1/4" = 1'-0"

HALF SCALE

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	NEW AIRPORT TRAFFIC CONTROL TOWER AND BASE BUILDING INTERMEDIATE ACTIVITY TOWER FIRE SAFETY PLAN FLOOR PLAN - 525 SF CAB								
	BOISE BOISE AIRPORT ID								
	REVIEWED BY	SUBMITTED BY				APPROVED BY			
		SUBMITTER'S TITLE				APPROVER'S TITLE			
		DESIGNED				ISSUED BY		DATE 01/25/2007 JCH	
		DRAWN				DRAWING NO. NM-D-ATCT-TF06			
		CHECKED				REV			
	3220 NE 4th Street, Suite 2020 Bellevue, Washington 98004 Tel: 425 325-4343 Fax: 425 325-4347 Email: BPA@BPA-ENGINEERING.COM								



